The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXVI. NEW YORK, SATURDAY, SEPTEMBER 26, 1903. No. 13.

THE ENGINEERING AND MINING JOURNAL
AND MINING AND METALLURGY ESTABLISHED 1866
PUBLISHED EVERY SATURDAY,
261 BROADWAY, NEW YORK.
TELEPHONE 6865 CORTLANDT. P. O. BOX 1833.
CABLE ADDRESS "ENGMINJOUR" NEW YORK.

W. J. JOHNSTON, President. F. J. PRATT, Treasurer.

T. A. RICKARD . . . . . EDITOR
FREDERICK HOBART, SAMUEL SANFORD . . . . . Associate Editors

SPECIAL CONTRIBUTORS.
NEW YORK . . . . . R. W. RAYMOND, JOHN A. CHURCH, JOSEPH STRUTHERS, J. PARKE CHANNING
BOSTON . . . . . W. R. INGALLS
PHILADELPHIA . . . . . R. A. F. PENROSE, JR.
WASHINGTON . . . . . S. F. EMMONS, W. H. WEED, J. E. SPURR
DENVER . . . . . PHILIP ARGALL, CHESTER W. PURINGTON
SAN FRANCISCO . . . . . CHARLES G. YALE
LONDON . . . . . A. G. CHARLETON, J. H. CURLE
JOHANNESBURG . . . . . G. A. DENNY
SYDNEY . . . . . F. DANVERS POWER

SUBSCRIPTION, payable in advance, $5.00 a Year of 52 numbers, INCLUDING POSTAGE in the UNITED STATES, CANADA, MEXICO, CUBA, PORTO RICO, HAWAII or the PHILIPPINES.
TO FOREIGN COUNTRIES, INCLUDING POSTAGE, $8.00 or its equivalent: £1 12s. 6d.; 32 Marks; or 40 Francs.

ADDRESSES CHANGED WHENEVER DESIRED.
In requesting change of address give OLD as well as new address.

NOTICE TO DISCONTINUE.
Should be WRITTEN to the New York Office in every instance.

Remittances may be made by P. O. Order, Express, Draft on New York or Registered Letter at our risk.

BRANCH OFFICES:
CHICAGO, Telephone, Harrison 3326 . . 520 Monadnock Block
PITTSBURG, Telephone, 504 Court . 701 Keystone Building
DENVER, ... 206 Boston Building
SALT LAKE CITY, ... 76 East Fifth South St.
BUTTE, MONTANA, ... 19 & 20 Owsley Block
SAN FRANCISCO, Tel. Bush 240, . . 320 Sansome St.
VANCOUVER, BRITISH COLUMBIA, . Molson's Bank Building
LONDON, ENGLAND, ... 20 Bucklersbury, E. C.
DORTMUND, GERMANY, ... Arndt Strasse 56

ADVERTISING COPY
Should reach NEW YORK office by MONDAY morning of issue week; CHANGES OF COPY by the PRECEDING THURSDAY.

Copyright 1903, by THE ENGINEERING AND MINING JOURNAL.
Entered at New York Post Office as Second Class matter.

CONTENTS

Editorial Notes 455
Present Condition of the Anthracite Industry..... 456
Mining Education in England..... 456
Misrepresentation of Mines..... 456
Mining Investment 457
Market Conditions 457
Metallics 457
A New Evil of the United States Mining Law *R. W. Raymond* 458
Cyanide Poisoning ..... *Arthur Chippendale* 458
Mine Sampling..... *Ernest Levy* 458
Geology of the Virginius Mine.....*C. W. Purington* 458
*The Ore Deposits of La Cananea.....*A. A. Steel* 458
*Across the San Juan Mountains.....*T. A. Rickard* 461
*Method of Concentrating at La Cananea *Martin Schwerin* 463
Design of Timber Trusses..... 464
*Fatal Accidents in Coal Mines in North America *F. L. Hoffman* 465
*The Mines of the Pinitos and Azul Mountains *R. W. Petre* 466
*Treatment of Concentrates on the Rand....*H. S. Denny* 467
Relative Advantage of 2,300-Volt Alternating Current vs. 550-Volt Direct Current, for Mine and Smelter Work *Hugh A. Brown* 470
*A Card System for Mine Supply Accounts *F. W. Denton* 471
Origin of Mineral Vein Fissures..... 472
*Alaska-Treadwell Mine 473
Abstracts of Official Reports..... 473
Books Reviewed 474
Correspondence 474
Recent Decisions 475
Questions and Answers..... 475
*Patents, United States..... 475
Patents, Great Britain..... 476

** Illustrated.*

DEPARTMENTS

Assessments 489
Chemicals, New York and Foreign.....487, 492
Coins, Foreign 488
Dividends 489
Financial Notes 488
Industrial Notes 477
Markets: Coal, United States and Foreign..... 486
Iron and Steel..... 487
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc.....488, 489
Mining News: United States and Foreign..... 481
Mining Stocks 485
Mining Summaries 477
Obituaries 477
Personals 477
Schools, Technical 477
Societies 477
Stock Quotations 490, 491
Trade Catalogues 478

THE LABOR SITUATION on the Rand, if not improving, is becoming better defined. According to the Chamber of Mines at Johannesburg, it is estimated that the shortage of labor amounts to 115,000 natives, the present available supply being 235,000, as against a requirement of 350,000. This refers to the Transvaal as a whole, and includes not mining only but public works, railroad construction, etc., the demands made by the latter having intensified the scarcity experienced at the mines. The conviction is growing that the only permanent remedy is the introduction of Asiatic coolies under indenture.

WE HAVE FREQUENTLY made a reference to the fact that the disorders which have disfigured the mining regions of Colorado are due to a confusion between politics and the administration of law. No event could emphasize this view in a more pointed manner than the nomination of Mr. Frank W. Owers for Justice of the Supreme Court. This was done by the Populist State Convention, and, in order to leave no room for doubt as to the intent of the nomination, it was accompanied by resolutions denouncing the present Governor of the State, who is endeavoring, amid difficult circumstances, to maintain order in the mining districts of Cripple Creek, Idaho Springs, Telluride and elsewhere in Colorado. The miners' strike has been thus made a political issue and all the unphilosophic rot of that hybrid socialism known as populism has been introduced into a controversy already embittered by the insidious interference of the Western Federation of Miners.

OUR BRITISH FRIENDS are somewhat disturbed over the report that an American syndicate has been formed ostensibly to purchase at a high valuation the ball-clay and kaolin mines in Cornwall, Devon and Dorsetshire, England. These deposits are believed to be the largest in the world, and besides supporting a prosperous pottery industry in the United Kingdom also furnish large quantities of clay to the United States and other countries. As to the authenticity of this report there is some doubt, primarily because most of the clay mines are owned by family estates and as such are considered a regular source of income, and secondly, prominent importers and consumers have heard little or nothing about the "American invasion," and are inclined to doubt the practicability of the scheme. In fact, some influential persons discredit the report.

THERE IS MUCH speculation, both here and in Europe, as to the advantage, if any, to be gained by the Chilean nitrate of soda industry from the Government auction sale next month of 21 plots of proved mineral-bearing land in Tarapaca and Toco, having an aggregate net value of $6,723,983 gold. Sales of this character are made periodically for the purpose of enriching the Chilean treasury, although a substantial amount is being collected as a tax on exports of nitrate of soda. Now more than ever do these land sales attract attention, as the entrance of new producers in the field means a readjustment of the individual quotas allotted by the combination in accordance with the exports and consumption. At present there are about 81 active oficinas in the combination, and others are being put into commission for the first time, while at least 8 of the older plants have ceased work in order to equalize the ratio of production for the current fiscal year. Fortunately producers are realizing good prices, and the demand has grown considerably, especially in the United States, where the use of nitrate of soda as a fertilizer is being energetically propagated. How long prosperity will favor the industry will depend to a certain degree on the employment of modern methods in mining and preparing this important mineral for market at a moderate cost to the consumer and also the economical management of the oficinas.

ANOTHER EXTRAVAGANTLY CAPITALIZED corporation, promoted in the reckless consolidation period of a few years ago, is about to liquidate its indebtedness by disposing of its assets at auction. Only a short time ago the same method was adopted by the Asphalt Trust and the National Salt Company. Now the Consolidated Lake Superior Company, capitalized at $117,000,000, and holding the controlling interests in extensive metallurgical works and other

enterprises in Canada, is about to satisfy a banker's loan of $5,050,000 and other debts, including wages, to the amount of something like $11,000,000. What the assets of the company will bring under the hammer remains to be seen, but it is almost certain that the stockholders will see their property go at a great sacrifice, with the possibility that it may be bought in by competitive steel-making interests, since the Consolidated Lake Superior Company has large iron and steel works and receives a bounty from the Canadian Government, which aids it in competing with foreign manufacturers. On the other hand, should the assets be purchased by the stockholders' protective committee, the company may be reorganized on a reasonable capitalization.

PRESENT CONDITION OF THE ANTHRACITE INDUSTRY.

The anthracite mines in Pennsylvania have already shipped this year over 12,000,000 tons more than the total shipments of 1902, and all indications favor total shipments this year of fully 60,000,000 tons, making an output far in excess of any previous year's record. This increase is, of course, due largely to the great strike, which cleaned up supplies of anthracite all over the country and even led to imports from Great Britain. In spite of the urgent demand for coal last winter and spring, however, the demand of late has been so much lighter that trade conditions have been characterized as quiet and dull, and newspapers lately have been printing stories of the principal companies closing mines by agreements, in order to restrict output and maintain prices.

As a matter of fact the over-production that has caused so much comment has been almost wholly of the small or steam sizes. These sizes are made at all collieries as a by-product in the production of the so-called prepared sizes. Of late years they have been turned out in large quantities at low cost by washeries working over old culm banks. The washeries in late spring and early summer this year were busier than in any previous year at a corresponding date. Normally the consumption of small sizes is less in summer than in winter, owing to their use in large heating plants. In addition, this year many manufacturers who use anthracite have had their plants tied up by strikes. As a result the market was gutted and now most washeries in the mining regions are temporarily closed.

As to the production of prepared sizes, but one company is reported to have made any effort to limit output by running short time; the other companies are simply taking advantage of the lull in demand to make repairs necessitated by the condition of breaker machinery after running at full capacity since the mines resumed shipments last fall.

Still, though in the aggregate a heavy tonnage is yet going from the mines, trade is quiet. It is not likely that the consumption of prepared sizes will fall off this year; all indications point to an increase in spite of higher prices. Yet there is a great contrast between present conditions in the trade and those existing six months ago. This contrast is a reminder of what has been pointed out often—that the productive capacity of the anthracite mines, as now opened, is in excess of the normal demand.

Much has been heard within the past few years of alleged illegal combinations among anthracite mining companies to restrict output and maintain unreasonably high prices, and certain newspapers have tried in every way to array public opinion against the anthracite operators. Yet time tests everything. Last spring's criticisms of the operators—viewed in the light of existing conditions—look rather pointless now. The evolution of the anthracite trade is still in progress. Any critic of present prices or of present methods should remember that no combination, however strong, can long maintain prices in the face of a falling demand, and that present methods of marketing coal, if not ideal, represent the final outcome of years of effort. Ultimately, here as elsewhere, the method best suited to conditions will prevail, spite of the best efforts of financiers or of politicians.

MINING EDUCATION IN ENGLAND.

The great educational revival which is stirring England at this time is interesting to our readers, if for no other reason, because it affects the Royal School of Mines, in the welfare of which also several distinguished American mining engineers, resident in London, have taken a generous interest. We referred to the matter the other day, and hope to do so again. For the present it will be well to draw attention to the words of Sir J. Norman Lockyer, in his presidential address before the British Association for the Advancement of Science. Sir Norman, himself professor of astronomical physics at the Royal School of Mines, made the observation that "trade no longer follows the flag as in the old days, but trade follows the brains;" and the brains, we would add, need training, otherwise they are no better than pulp. A School of Mines annexed to a sort of manual training school and scientific kindergarten, the whole royal hotch-potch in receipt of the princely endowment of $90,000, is a pitiable thing to contrast with the mineral production of the British Empire, aggregating in value at least $1,500,000,000 per annum, including control of more than one-half the gold mining of the world, together with mining investments within its own borders and outside of them, aggregating millions for every dollar received by the struggling School of Mines, which is as rich in noble traditions and the great names of science as it is starved for the mere necessaries of life. Why, Sir Norman Lockyer himself elucidates to the budding mining engineers the fascinating problems of astronomical physics, and, in a manner quite in keeping with the whole system at South Kensington, this accomplished astronomer occupies some of the time of students who certainly have none to spare for this academic subject. This "dead-wood" hampers the course of training given to those who are preparing for a mining and metallurgical career; and there are lectures (not elective) on organic chemistry, the niceties of photography, and other subjects wholly foreign to the matter in hand, together with much time given to the making of galvanometers, barometers and other apparatus, which in real life—as contrasted with the dreamland of doctrinaire education—are usually bought for a small sum by those who need them. Such "dead-wood" in the educational course of schools of mines is not known at establishments which are better endowed and more systematically managed than the historic institution of which Huxley was the dean, and Tyndall, Percy and Ramsay lecturers. The moral of it all is, that it would be well to ask mining engineers and metallurgists, who have had the experience of a career, for suggestions and advice, not leaving the training of young men entirely to the devices of government officials, military men and scientific truth-seekers. The Royal School of Mines, with its most un-royal endowment and bourgeois administration, is not the only mining college which would be benefited by getting into touch with the realities of life and with the men who have faced the buffets of work in the field.

MISREPRESENTATIONS OF MINES.

A bill is pending before the legislature of Alabama, which is entitled "An act to prohibit the false statement of the condition of any firm, association or corporation by any officer, agent, servant or employee thereof and to punish the same;" the bill provides, further, that any official of a company assenting to the publication of untrue or exaggerated statements or reports having a tendency to, or intended to, inflate the value of stock, is guilty of a felony.

While we believe that the legislature of Alabama cannot legislate honesty into promoters and financial agents who choose to act otherwise, and that such a bill as this is unlikely to become a law, nevertheless we welcome the incident as a manifestation of a better public sentiment, calculated to impede the operations of those who prey upon the simple members of the community.

A case in point is afforded by the letter which we publish on another page from a highly reputable mining engineer in Mexico, in the course of which certain gross misrepresentations are exposed. The letter speaks for itself, and it remains but to draw attention to the fact that of all the delusive assertions made concerning mines, none is more misleading than that which bases a value for property merely on the score of propinquity to known rich mines. The advertisements and prospectuses of irresponsible people usually contain some such statement as that the Great Wild Cat Extended is adjacent to the celebrated Mother Lode mine or the Bullion Unlimited is next door to the well-known Bonanza King, etc. Usually anything from five to fifty miles is the distance separating the hungry prospect advertised and the celebrated old mine which is claimed as its neighbor. Apart from the falsity of such data, it must be emphasized that neighborhood to rich mines conveys no assurance that their wealth will be shared. Many prospects are like the poor people who live in the same block as a millionaire; the comparison is only odious, and vicinity conveys no claim upon the charity or generosity of their neighbor. Of course, as regards mines, the notion of persistence of richness is based on the old theory that fissure-veins continue with the undeviating width and value of a sheet of paper placed on edge; but as a matter of fact, if there is one thing which we have learnt about ore-shoots, it is that they are concentrations determined by local structural conditions and, in their very nature, they are erratic.

It is like whipping a dead dog to attack the majority of mining schemes the stock of which is peddled throughout the country by means of misleading advertisements and solicitations. In most cases the harm is done before criticism can be of service. Our readers, at all events, have no excuse if they fall into such palpable traps, because the discussions on mine valuation and ore estimates have been clear enough to serve as a guide to anyone expecting to invest in mines. Certainly it should be evident even to those most innocent of actual mining experience that stray assays, one or two samples, width of rock, the contents of which have not been accurately tested, length of ore-shoot, the net value of which per ton is guessed at, propinquity to rich mines and other similar items of information are, as evidence, no more valuable than descriptions of natural scenery or suggestions of value based upon climatic conditions. Each mine must be taken on its merits, and only a properly qualified man can determine *that*.

MINING INVESTMENT.

Our friend Mr. J. H. Curle has been writing a series of useful articles in the London *Economist;* his utterances have been couched in very plain language, and have conveyed a large measure of unadorned fact intended obviously to puncture some of the filmy sophistries which obscure the business of mining. Finally, at some one's suggestion, he has given the readers of *The Economist* a dose of advice which summarizes a good deal of what he has previously said. With the general tenor of these *obiter dicta* we do not quarrel; on the contrary, we welcome the introduction of so much good sense into mining matters, and congratulate the author on the excellent results likely to accrue from his outspoken ratiocinations. However, as we ourselves live in a country where mining is still young and hopeful, with some of the exaggerations of youth but with all of its vigor, we take exception to certain of his conclusions. The latter undoubtedly suffer from brevity; unqualified generalizations are rarely impregnable, and in this case they are obviously endangered by the enormous range of conditions covered by the mining regions of the world. Mr. Curle says: "Don't invest in copper, tin or silver-lead mines, but stick to gold mines." Of course, this advice is intended not for mining operators or knowledgeable people, but for the average investor, who, like an innocent child, is supposed to wade on the edge of the sea of financial speculation. "Gold has a fixed value," he goes on to say, "whereas violent fluctuations in the prices of other metals upset all estimates of the earning capacity of the mines producing them." Why, then, should one not avoid risk of any kind and buy Consols or United States bonds, or conservative bank stock or debentures of the most gilt-edged variety? Why? Simply because people who go into mining do so because they want a bigger return for their money and expect to get the benefit of a speculative enhancement of their principal. Bring mining to the strictly investment basis of which Mr. Curle writes so much, and it shrivels to feeble dimensions indeed. The investor who wants to eliminate all risk in mining is like a man who expects to go bathing without getting wet. Such ideas entirely misinterpret the spirit of legitimate mining. What shareholder, we would ask, wants to forego entirely all the possibility of favorable development or of new disovery? It is the chances of such enhancement to the value of his holding which gives the zest to the business. Such possibility of further discovery entails inevitably the equal possibility of disappointment; the uncertainty cannot be all in one direction. In other words, the mining investor only asks that he may get "a run for his money." In Cornwall shareholders are known as "adventurers," not with the modern meaning of irresponsible schemers, but with the old Elizabethan idea of men who go on a venture, take a reasonable risk, and are hopeful of a favorable return.

Mr. Curle has expressed great respect for the good sense of American engineers and mine operators; we feel safe in saying that these men heartily disagree with any such sweeping statements as the foregoing in regard to mines producing metals other than gold. Of course, when the product of a mine is liable to fluctuation in market value, the purchaser of it or the stockholder will expect a larger dividend to compensate for the added risk. Markets vary; even the purchasing power of gold is not constant; but the conclusion is not to try and get rid entirely of an essential factor—risk—but to require a proportionate return in the rate of interest. There are many of our readers, we feel assured, who, if asked to choose between a gold mine yielding a small rate of interest with but little risk (such is the mine Mr. Curle recommends) and a silver-lead, copper or tin mine with a larger risk but with a bigger return for their money, will select the latter. The idea that all gold mines must have 60 per cent of their market valuation represented by net profit on ore in reserve and must yield 10 per cent on their investment price is the dream of a doctrinaire. There are a few such mines being quoted on the exchanges, and they exist just now mainly by reason of a busted bull market and an unusual condition of financial depression. When better times return, even these shares will rise to a figure at which they will cease to fulfill the requirements which Mr. Curle exacts; and then the economist of *The Economist* will have a theory with no actuality to support it.

MARKET CONDITIONS.

September 23.

Business in most lines has been rather quiet this week and prices show few changes.

Silver continues steady. The shipments from London thus far this year show quite an improvement as compared with 1902, owing chiefly to the greater demand from the Straits Settlements, where the silver is used mostly for making payments in the tin trade. India is slowly recouping its loss in the importation of the white metal, and lately some large orders have been filled for that territory.

Copper has been pretty dull this week, although first hands have been free sellers on rather small orders. Prices are easier. Abroad, speculators have been hampered somewhat by dearer money and political disturbances. Exports from this country have been on a slightly larger scale this week, while imports are less frequent, although fair quantities of the red metal have arrived, chiefly from Great Britain, and another cargo of Tilt Cove ore is reported at New York.

Tin exhibits the operations of a small speculative clique to corner spot supplies, with a view to strengthening prices. Otherwise the market is being adversely influenced by the weakness in prices in London, notwithstanding the fact that the South Wales tin-plate plants have recently settled their labor troubles and are again working. Consumption continues fair.

Lead is doing a moderate business at last week's advance in price. Production of late has been on a good scale.

Spelter feels the slackening of demand from galvanizers, but there is no change in prices, which are considerably better than a year ago.

In the iron and steel trades, reports of market conditions continue conflicting. While prices for certain finished products are pretty firmly held with small prospects of any immediate break, other products show weakness and lower prices are noted. The market for pig iron is peculiar, in that buying is almost wholly for current needs, consumers not purchasing ahead at all. Prices for foundry iron are weaker, and bessemer pig during the weak sold in Pittsburg for the lowest price in two years. Under such conditions little improvement in the market is to be expected, and the opinion is freely expressed that prices can be maintained only by furnaces reducing output.

The movement of iron ore down the Lakes is likely to be greatly restricted by the strike declared by the masters and pilots of the Pittsburg Steamship Company's fleet, numbering some hundred and twelve boats. It is not yet certain whether the United States Steel Corporation, which controls the Pittsburg Company, will be able to get ore down in tow barges towed by steamers owned by other companies. Failing in this step, the shipments of ore by the Steel Corporation will close, this year, six weeks earlier than usual.

In finished iron and steel there is generally improvement, but bars and sheets are weak and lower quotations are noted. There is no prospect of any change in rail prices. The price of steel billets is reported shaded at certain delivered points, but mill quotations are unchanged. The outlook for structural material has improved considerably of late.

Generally speaking, the coal trade shows some improvement. Demand for domestic purposes at points west of Chicago has improved because of the short-lived cold wave. Demand for manufacturing purposes in the same territory showed little change. The tying up of the fleet of the Pittsburg Steamship Company will mean something to shippers. Fortunately, the movement to upper lake ports has been so heavy that the outside tonnage should suffice to get enough coal on docks at upper lake points before navigation closes. In Chicago territory Illinois and Indiana coals are in such good supply that prices have been cut considerably, and further cuts are expected unless production is reduced. Along the Atlantic seaboard bituminous coal is in abundant supply at most points and demand improves but slowly. Car supply does not affect the market, since it is sufficient for the current needs of most producers.

The demand for anthracite coal in Chicago territory and at the head of the lakes improved while the cold wave was on, but has now fallen off again. Along the Atlantic seaboard conditions have not changed during the week, and the market is quiet, awaiting lower temperatures. The glut of steam sizes continues.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

Cinnabar deposits are being explored around Zeerust in the Transvaal. The production of mercury in that region would be most serviceable to the gold mines.

Brunton proposed to use a wind hammer for boring, worked by compressed air, as long ago as 1848, according to the reports of the Royal Cornwall Polytechnic Society.

"Dyzhued the lode" was an old Cornish phrase, and meant the taking away the worthless portions of the lode, leaving the rich portions intact. "Hulking" was taking out the richer portions first.

Titanium is of wide occurrence, being found not only in the mineral kingdom, but also in dead bone and muscular tissue. A small percentage of titanium added to another metal will make a hard and tough alloy, which may be used for special castings.

Natural gas is composed chiefly of methane or marsh gas and the related gaseous hydrocarbons of the paraffine series. In the gas wells of Wetzel County, W. Va., the proportion of methane by volume is over 95 per cent. The total annual output of all gas wells in the United States is fully one cubic mile.

The reckless waste of the natural gas supplies of Pennsylvania, Ohio and Indiana is one of the greatest economic crimes committed in this country. Millions upon millions of feet of this ideal fuel were not utilized at all, and other millions of feet were burnt in huge flambeaux to advertise town sites.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

A NEW EVIL OF THE UNITED STATES MINING LAW.

The Editor:

Sir.—The controversy between Mr. Weed and Mr. Robinson, of Butte, Montana, concerning which an editorial appeared in the ENGINEERING AND MINING JOURNAL of Saturday, October 19, calls for a comment quite independent of the immediate misunderstanding which it involves. On that head, respecting, as I do, the character and the motives of both parties, and deeming both of them incapable of conscious violation of an honorable agreement, I have nothing to say.

But it is a ridiculous and shameful thing that mining titles, under the Federal law, should be so dependent upon geological discoveries and opinions as to make mine-owners afraid to have their mines examined by the geologists of the Government, lest the results of such scientific study should affect their rights to real estate, held by virtue of formal deeds, bearing the seal of the United States.

The Butte district is furnishing an object-lesson concerning one mischievous mining law, at which the investors of capital may well stand aghast. Without pronouncing upon the merits of any one of the scores of mining lawsuits which have cursed, and still curse, that productive region, it may be said that millions of dollars have been directly expended or indirectly lost by all parties, through litigations which a just and simple law would have made impossible. Why are the copper-mines of Butte thus handicapped, while the equally valuable copper-mines of Lake Superior are never the subjects of such doubts and conflicts of title? The answer is simple and conclusive beyond question. The copper-mines of Michigan have never suffered the malign influence of the "Law of the Apex."

New York, Sept. 23, 1903. R. W. RAYMOND.

CYANIDE POISONING.

The Editor:

Sir.—Having observed with interest the discussion in your valued paper on the subject of poisoning by cyanides, I venture to suggest the following remedy: Immediately after the poisoning a weak solution of silver nitrate should be taken internally, in slight excess, followed by an emetic of salt water and mustard. The patient would then probably have to be treated for inflammation of the stomach, which is not so dangerous as the cyanide poison. The inter-action between the cyanide salt and the silver nitrate is very quick; the excess of silver would be precipitated by the salt water, with the liberation of nitric acid, but providing that this latter be sufficiently dilute I do not think that it would have time to do fatal damage.

ARTHUR CHIPPENDALE.

Chirangangue Mines, Michoacan, Mex., Sept. 6, 1903.

MINE SAMPLING.

The Editor:

Sir.—Having derived much profit from your series of articles, one point occurs to me which I have not seen mentioned in the discussion. I cannot think that it will be of use to any but a few of the younger members of the profession; nevertheless, I trust it will be of service, if only to a few.

I refer to a very short-sighted method of estimating ore in a mine on data procured from milling or smelting returns, together with certain information as regards the persistence of the vein. In several instances, where hurried examinations have been necessary, I have known of this being done, effecting grave errors. Take, for example, the case of an old mine, inaccessible from the fact of its tunnels having caved, or for some other reason, and that time will not permit of the workings being cleaned, and that for these reasons the engineer considers that non-self-procured information will do as well. From a description of the underground workings and possibly also a map, it is understood that the vein has been opened up for several thousand feet; and, besides this, the engineer may have confirmed this statement by his own examination of the surface. He is also told that so many tons have been mined, shipped and a good net profit returned, which he verifies from the mills and smelters themselves. Then, from the maps, he calculates the tonnage of vein-matter opened up, applies the smelter and mill-returns to this figure, and on these data he bases his value of the property. He is likely to confuse the words vein and ore-body, and he may entirely fail to recognize that all the ore opened up is likely to have been removed.

The error herein shown seems so obvious that I offer these few lines simply because I have met with instances in which such carelessness, or perhaps rather ignorance, has been the foundation of favorable reports on probably worthless properties.

Denver, Colo., Sept. 15, 1903. ERNEST LEVY.

GEOLOGY OF THE VIRGINIUS MINE.

The Editor:

Sir.—The valuable communication from Mr. H. W. Reed in your issue of August 22, relating to the Virginius mine, is worthy the attention of those who have investigated the ore-deposits of the San Juan mountains. Several facts which have not, to my knowledge, been previously published, are here made clear. The example set by Mr. Reed in giving some of the results of his opportunity for many years' observation on the phenomena of a single vein is one which it is hoped will be followed, so far as possible, by mine managers in general.

It is interesting to note that when the quartz and ore in the Virginius locally gave out, cross-cutting to a parallel crevice resulted in the finding of a new ore-body. This fact lends confirmation to the observations made throughout the San Juan region as to the prevalence of linked-vein structure. The changes in the value of the ore at various levels in the vein and the increase in the gold values noted below the seventh level are important additions to the literature of vein phenomena.

Mr. Reed notes that normal faulting has occurred along the Virginius fissure, thus confirming parts of the description of this mine published in 1898.[1] There is well-marked evidence of such faulting in the workings along the Revenue adit level of the Virginius. Mr. Reed notes that "the footwall was probably pushed up several hundred feet," but I cannot say that I saw evidence of such extensive displacement. Most of the fault-throws observed in this portion of the San Juan are of small magnitude. I have not, however, inspected the upper workings of the Virginius.

I am inclined to take issue with Mr. Reed on his statement as to the character of the Virginius ore-deposit. He says, "What is known as the Virginius vein is a deposit of galena mixed with gray copper, which is a replacement (by the galena) either of part or all of the andesite dike or of the country rock immediately adjoining." It is difficult to conceive of such an origin for the Virginius vein. Metasomatosis has not been found to play an important part in the formation of the ore-deposits of the portion of the San Juan in which the Virginius is situated, especially where the wall-rocks are of silicious or moderately silicious character. Even in the Red Mountain area, where ore-bearing solutions have exhibited an intense activity, it has been found by Mr. Ransome[2] that the veins and stocks of ore occupy for the most part previously existing open space. A vein in the andesitic breccias having such an origin as Mr. Reed attributes to the Virginius would be decidedly at variance with the majority of the observed occurrences, and would not be likely to have economic importance.

The andesite dike accompanying the Virginius vein I have had the opportunity of examining on the Revenue level for a length of over 1,500 ft. It does not show mineralization in that portion of the mine, being distinct from the ore-body. "Under the microscope this rock is rather indeterminable, on account of decomposition, but may be seen to contain feldspar phenocrysts, with a much chloritized groundmass in which there is a large quantity of magnetite."[3] It will be noted that there is no mention here of the presence of metallic sulphides, even iron pyrite. Moreover, the andesite dike of the Virginius is very similar to dikes seen in the workings of other San Juan mines, as, for example, the one in the Sheridan tunnel[4] of the Smuggler-Union. In none of the observed cases do the dikes appear to constitute the ore-bodies, although they frequently bear a relation to the occurrence of the ore.

Denver, Colo., Sept. 15, 1903. C. W. PURINGTON.

[1] Preliminary Report on the Mining Industries of the Telluride Quadrangle, Colorado, 18th Annual Report United States Geological Survey, Part III, 1898, page 780.

[2] A Report on the Economic Geology of the Silverton Quadrangle, Colorado, by F. L. Ransome, United States Geological Survey, 1901, page 214 *et seq.* The ore-deposits in the rhyolite of the Silver Ledge mine forms an exception to the general rule.

[3] Telluride Report, page 837.

[4] Telluride Report, page 833.

THE ORE DEPOSITS OF LA CANANEA.

The Editor:

Sir.—From the articles concerning La Cananea by Messrs. Weed and Austin, and my own observation, it appears that the apparent geological indications have varied at different stages of the development of the mines, and some data gathered at an intermediate period and a correction of some hearsay evidence may serve to explain their conflicting views. I went through the mines at frequent intervals from November, 1901, to July, 1902; and, to study the action of heavy ground and the labor problem, I spent some 30 shifts working as a "mucker" in various parts of the Capote mine. Therefore, unless otherwise stated, the statements I make are a result of my own observation.

In the old Cananea volcano there is a great development of basic rocks of coarse, granitic texture; but a careful search for a reported rare rock revealed but one small outcrop of a true granite, viz., in the Puertecitos gap, about three-quarters of a mile east of the Puertecitos mines, at which place are the nearest sedimentaries. This granite was of very fine texture and showed traces of varying amounts of pyrite and a little actual pyrite. On the north this is much covered with soil, but seems to be level, under a light-colored eruptive; but to the south the contact with a large area of dark trap appears to be more nearly vertical than horizontal, so there seems little local evidence to warrant Mr. Weed's assumption of a general granite core at slight depth.

There are several distinct volcanic rocks in the foot-hills on three sides of the mountain, although the railroad grade to Puertecitos shows only white rocks. Most of these white rocks belong to the quartz-porphyry set, but some of the white chalky cuts show big crossed crystals of a feldspathic mineral and other structural features of a rock which, a little lower on the mountain, is nearly black on fresh fracture, and weathers to a dark blue groundmass with white crosses in relief. Owing to the soil the gradation could not be studied, but this complete leaching may be related to some of the changes in the sulphide-bearing porphyry.

All of the porphyry which has the pyrite uniformly distributed, and apparently original, is very silicious. It is all very hard, and in places has specks of unaltered pyrite within half an inch of the surface. Where there is disseminated pyrite the rock is too fine-grained to determine any mineral without a microscope, but toward the center of the volcano it gradually develops phenocrysts. In places there are so many double pyramids of quartz that the rock resembles a coarse, hard sandstone. The distribution of this pyrite is extremely irregular.

The pyrite in the soft porphyry, as far as the developments then showed, was only in thin intersecting seams and not original, but in the Oversight mine portions of this porphyry carry finely disseminated chalcocite in much the same relations as the original pyrite of the hard porphyry. This soft stuff is, of course, too decomposed to determine, and I could find no transitions from soft to hard porphyry.

At the time of Mr. Weed's visit to La Cananea the Oversight mine was not developed, and except the Cobre Grande, all the deposits appeared to be replacements in metamorphosed limestone.

The Cobre Grande deposit was a high-grade secondary enrichment of cuprite, etc., in a narrow recent fault-zone in the porphyry, with stringers and replacements in the walls. The fault was traced a long distance north, and in the ravine beyond the smelter gave rise to the only considerable spring in the mountains. This spring went dry when the Cobre Grande shaft was sunk deeper in hope of increasing the water supply of the camp.

The old workings at Ronquillo were caved and inaccessible, and so may be related to the Cobre Grande, or be independent concentrations in the porphyry, since the main fault is barren where it passes under the converter room, in porphry without pyrite.

In the Cobre Grande there is some soft porphyry, but except in the fault, it is gritty and brittle and not tough and talcy.

At the time I saw it the Oversight was but little more than a prospect, although some very rich ore had been mined in January, 1902. The development was limited to two tunnel levels, and showed some six or seven, not very large, bodies of rich ore. Two may have been connected vertically, but the others were mostly stoped out and certainly independent, although surrounded by concentrating ore which was not mined at that time. The greater proportion of the tunnels showed material either barren or of very low grade, so that if later developments have shown the workable ore to be in a single body, it must be extremely irregular.

A careful search in this mine showed one patch of yellowish limestone fading off into the tough, clayey material, and hardest in the breast of the tunnel; but most of the clay seemed to be derived from a feldspathic porphyry. Also at the lower part of the zone of oxidation there was a notable amount of rich azurite and malachite ore. These ores, especially azurite, are quite rare in the Capote basin, and are so seldom found independent of limestone that it seems possible that limestone was more important during the formation of the Oversight orebody than is at first apparent. The chalcocite forming a secondary enrichment might as well replace the pyrite disseminated in the porphyry as the chalcopyrite in lime, although it may have been all leached from a body in lime.

In the Capote mine up to July, 1902, all the workable ore above the 200-ft. level (100 ft. below the tunnel) was essentially sugary quartz carrying pyrite, coated and replaced by secondary copper minerals. There was no noticeable chalcopyrite or galena, and no porphyry ore of smelting grade. The high-grade ore-body was quite sharply defined. On the south and west there is a tough, clayey stuff with narrow intersecting seams of pyrite, and apparently derived from a blocky porphyry.

On the other sides the material is a much squeezed, clay-like substance, with some streaks of various greenish colors. Besides the clay seams it contains a good deal of chlorite and gypsum and some crushed quartz. There are some sharp veins of fine selenite with a little pyrite. On the surface the only rocks in these directions are sedimentaries (limestone and quartzite), and it seemed to me that this decomposed material might be the residue left by the action of acid solutions on a very impure limestone like that near the Democrata mine. It is very like the clay between the lime and porphyry at Bisbee, Ariz.

The quartz of the ore-body is much disintegrated, so that the ore comes out as sand. Much of this seems to be due to later movements, but in a few places this soft quartz contains perfect vugs with fine crystals undamaged. It is all very white and the sulphides are uniformly distributed throughout the mass. In the main drift of the 300-ft. level, which had been driven about 40 ft. from the shaft at my last visit, one side of the breast showed the greenish material (resembling decomposed trap), in coarse angular fragments cemented by soft sugary quartz with vugs and bright crystals of pyrite. This shows that some of the white quartz, at least, is recent vein-quarts, and except for the small amount of mineral and abundance of crystals, it very much resembles the main mass, but there seems to be little other reason for assuming that the Capote deposit is what Mr. Weed calls "a shattered mass of quartzite, whose joints, fissures and interstices are filled by ore."* The deposit is not very much longer than wide and definitely stops at both ends.

It is true that there is a large mass of quartzite just across the creek from the Capote tunnel in such a position that it would cut the upper part, at least, of the Capote vein if not disturbed; but a part of it is thinly interlaminated with limestone, and if there is no disturbance the main body should appear in the big mass of lime which is just south of the mine and was extensively quarried for flux. If the quartz of the ore-body consisted of crushed quartzite there should also be quartzite in the position of the "nondescript material" between the ore and the quartzite in the creek, and this shows but little quartz.

On the other hand, the big body of limestone southeast of the mine is in contact with the main body of gossan and lies over this "nondescript material." In the other side of it was one of the larger ore-bodies mined from old "No. 3." It is all iron-stained slightly, and the extensive quarrying has disclosed other pockets of gossan definitely representing oxidized ore-bodies replacing the lime.

The copper sulphides in all parts of the Capote ore-body are very soft and crumbly, and most of the larger grains are pseudomorphs after pyrite (octahedra). In the 200-ft. level there are many clusters of pyrite crystals at the edge of the quartz-body, with remarkably bright faces, and many of the crystals in the ore have but a thin coating of the copper minerals, so that tenor of the ore in copper was noticeably less. There was, therefore, no evidence of good chalcopyrite as the original source of the copper, so there seemed little prospect of this ore continuing of workable grade downward to the granular rock. Although I consider the main body of this mine to be as much a replacement as any in the district, I did not understand, as Mr. Austin seems to, that Mr. Weed included it among the contact-deposits that were to extend downward.

As a structural feature, I noticed that the size of the ore-body on the 200-ft. level had become much smaller, since the south end, especially, dips strongly inward. Therefore, the inference from Mr. Austin's paper that there is now workable ore in the porphyry below this quartz is a pleasant surprise.

As further evidence of a change in the character of the ore with depth, I would call attention to Mr. Austin's statement that the surface gossan was so low in silica as to be used for a basic flux. This was mostly from the large, hard boulders, lying loose on the surface; but over "Section One" of the Capote was a considerable mass of soft iron oxide, in place, that was regularly mined. This, of course, also carried silver. Except one bunch of chalcocite in the Oversight, all the sulphide ore I saw developed was very silicious.

As throwing light on the important change in the general character of the ore mined at La Cananea, it may be well to state that the concentrator was designed simply to treat the low-grade silicious ores from the Capote and Veta Grande mines; and even at the time I was there the designer said, "What little sticky ore we will get from the Oversight can be mixed with enough sandy ore to prevent trouble." This was quite different from the present experience with "clayed fines."

Both Mr. Weed and Mr. Austin considered the Capote and Oversight ore-bodies closely related, and the same view was evidently held by the local managers when they dropped the name of Oversight and sunk a big three-compartment shaft half way between the mines. At the time of my last visit much work had been done at this shaft, and a double-track tunnel had been driven for 300 ft. beyond the Capote ore-body to connect the shaft and the railroad. None of these workings showed anything but the narrow seams of pyrite in porphyry. The entire length of the railroad cut from the Democrata to the Indiana shows equal or greater mineralization, so that all the ore-bodies of the Capote basin are just as closely related as these two. From the size of the big dump in Mr. Austin's Fig. 2 a great deal of work must have been done at this shaft since I left, so that there may now be other evidence.

The Veta Grande mine is not mentioned by Mr. Austin. It was the first mine in the Capote basin extensively worked, and the high-grade parts were gouged out in a very irregular way. Work in these old holes was stopped soon after I came to La Cananea, and the attention confined to systematic development at some distance away. I made but one long visit to this deposit, and at that time could not coax the shift boss to show me anything but successive, irregular flat stopes on particularly rich streaks. Therefore I am not yet satisfied as to its geology. The ore above a certain sticky, clay body, some three feet thick and nearly horizontal, consists of sheets of native copper and a little sticky clay in a uniform mass of fractured quartz. Below this clay band is a great deal of cuprite, chalcocite, etc., in a more clayey matrix. The ore-body is large, and from fair surface data seems to occupy the exact contact between an impure limestone and a dike of hard porphyry, and to lie partly in each.

The great width of impure limestone between the Veta Grande and the old Democrata is full of epidote, etc., and is strongly impregnated with pyrite, sphalerite and chalcopyrite, but still shows its stratification, since some of the strata are more strongly impregnated than the rest. At the eastern contact there was also workable ore in the Democrata, and hearsay evidence indicates that in certain strata the mineralization extends for some distance from the contact.

The porphyry just west of the Veta Grande is made up of fragments of an older porphyry in a matrix of similar material, and is quite porous and heavily stained by superficial iron oxide. Still it stands up twenty to thirty feet above the metamorphosed lime. In this are many surface "Spanish workings," but extensive tunneling below shows nothing but the usual pyrite.

On the Indiana ground, just north of the Capote, is another similar cliff of porphyry. In this are one large "Spanish" pit and some prospect holes, which show a little galena, notably one sharp seam 4 to 6 inches wide, right on the west contact with a pure marble. Up to the time I left, the big Indiana dump showed a good deal of pyrite and very little copper, as the result of exploration in the porphyry.

In contrast with this, on the eastern side of this property, where the central body of limestone is in contact with the main mass of porphyry, there is a large area showing much iron oxide in place of the limestone, and the adjoining porphyry is quite decomposed. This is the best surface showing in the camp, except possibly that of the Capote, and proves that either there is a large ore body replacing the limestone, or that one has been eroded away. Unfortunately this had not been explored at all, and in the district there are many other untouched masses of gossan in limestone.

In the Elisa mine the ore-bodies seem to be replacements, by quartz and sulphides, of the calcite remaining after great developments of garnets, etc. These ore-bodies are therefore extremely hard, except the high grade ones, which have enough massive chalcopyrite to be easily mined. There is a little pyrite, and the low-grade bodies have a good deal of galena.

From the clear surface indications these deposits are at or very near a contact, and seem to me to

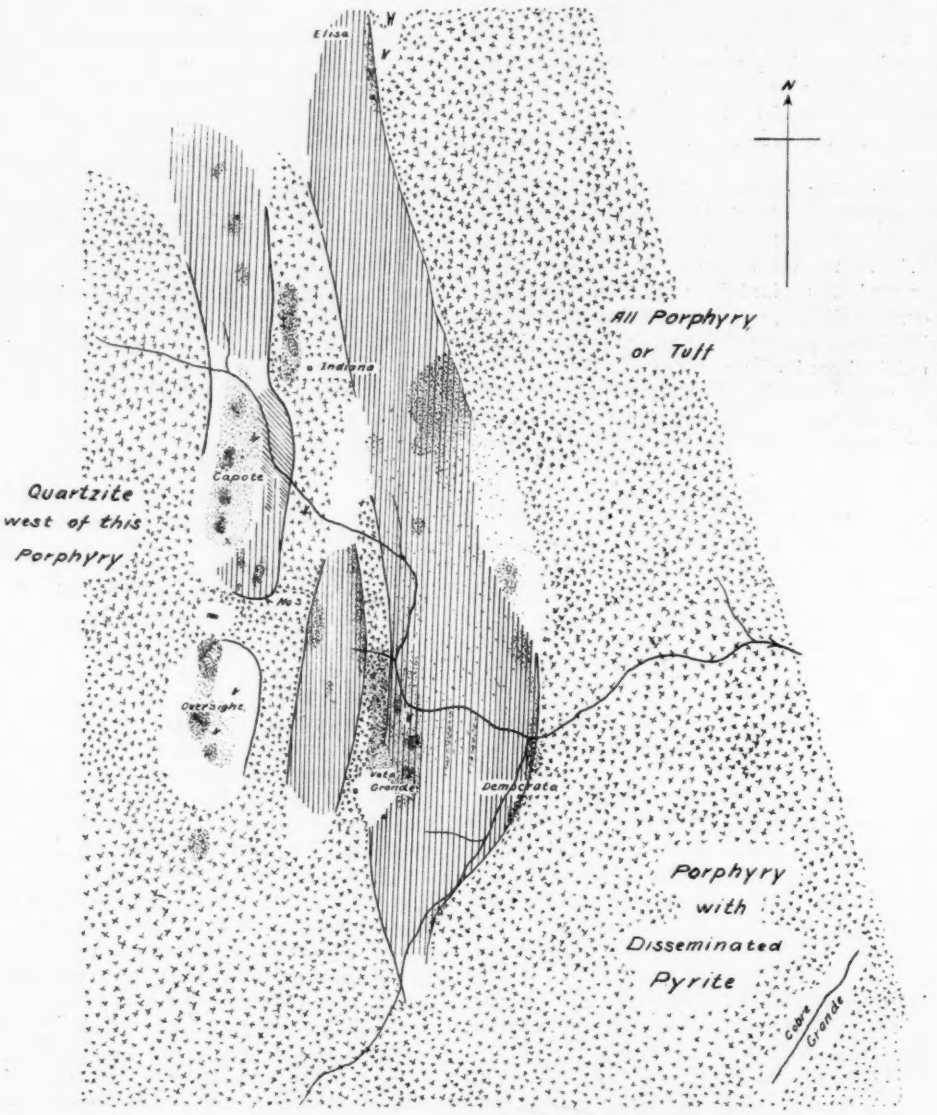
* *Transactions* American Institute Mining Engineers, Vol. XXXII, page 433.

exactly fit Mr. Weed's description of "chalcopyrite ore bodies with accessory galena and practically confined to the rocks resulting from the alteration of impure limestone." In the larger sense they are contact deposits, and I would expect other similar bodies to be found at intervals as far down as the limestone extends. This mine is one of the older ones, and was once relatively more important than some of the newer ones.

At Puertecitos I saw a great surface showing of copper carbonates, etc., but rather extensive developments had as yet failed to show any apparently commercial bodies of sulphide. The main double-track tunnels pierce a garnetiferous limestone so decomposed as to require timbering. The road to Elenita shows copper stains nearly all the way along the contact.

There are a few further points in Mr. Austin's article with which I do not agree. First the surface indications above the Oversight seem to me to be very strong. From a distance the larger part of the northern slope of the hill south of it appears heavily iron-stained, and a little shaft sunk on the stain to test it for iron flux produced a most brilliant red dump. This material is soft, consisting largely of iron oxide, and not the elusive, skin-deep stain on porphyry which is so common in the district.

From the west side of the mountain I saw other spots of iron-stain on the west slope of this hill for a long distance south of the last workings of the mine. Rumor gave these spots as one of the reasons for driving a long prospecting tunnel into the porphyry west from the deep cañon south of the Veta Grande. From a distance, judging from the topography, these spots seemed to be stained porphyry. They were so inaccessible that I did not take time to make the climb.



SKETCH OF THE GEOLOGY OF A PORTION OF LA CANANEA.

To sum up, at the time of Mr. Weed's visit, the Oversight was a little-developed prospect, so that, excepting the relatively small deposit in the Cobre Grande, all the mines of La Cananea were in the wider sense contact-metamorphic deposits in altered sediments. They were, however, so different among themselves that I do not think he was justified in giving the name of "Cananea type" to one particular kind of deposit without specifying which of the Cananea mines he meant. For instance, from evidence given me by the foreman and assayer of the Democrata mine, I understand that it is strictly a "selective replacement of particular strata along a contact," etc. The more recent data presented by Mr. Austin indicate that at present the most important mine of the camp is not a contact-deposit at all, and this will be the first mine called to mind by the mention of La Cananea.

Mr. Austin states that the porphyry is "the predominating rock of the Cananea ore-belt." In answer to this, I submit the rough line sketch of the geology around all the mines except the distant Puertecitos, where we all agree that the metamorphic limestone is the important rock. The region was not studied for the purpose of making a geological map, so all the detailed courses of the dikes were not worked out, but the map is mainly correct, except possibly in not continuing the main limestone belt further south. The blank spaces were not visited, or else were too much obscured by soil or complete decomposition to be determined.

Now, if we bar the unique Cobre Grande and draw a line as closely as possible around all the other mines, it appears that the metamorphic rocks have a greater area than the porphyry. Further, except the large area beyond Puertecitos, these patches are the only bodies of limestone I found in the mountains, and here are the mines. I pretty carefully explored the country between the main district and Puertecitos, and could find no limestone. It is all porphyry, and there are no mines.

Much of the better-looking lime has not been explored, and the porphyry is full of tunnels, mostly barren. The only entirely barren limestone is the pure white marble between the Elisa and the Indiana, which in places shows sharp contacts without any accessory minerals.

Even the Oversight may have had an original intimate relation to limestone, as outlined, and I certainly think that from an economic standpoint the limestone is the important rock.

I also do not agree that the metamorphosed limestone at La Cananea is a particularly resistant rock. All of the limestone along the creeks shown on the sketch is full of epidote, etc., but it nowhere forms prominent bluffs, and the cañon is not rugged except in the porphyry. Even at Puertecitos the garnetiferous limestone requires heavy timbering.

On the other hand, all the bodies of porphyry stick out very prominently, often forming rugged crags, especially in the Capote basin. According to common rumor, it was this fact that led to most of the badly planned tunnels in the porphyry far from the ore bodies. These were driven in the early days "in the hope of finding ore under the fine outcrops of the big ledges."

When I worked in the Capote I saw but little first-class ore that could be called swelling ground, but much of it was very brittle and often sandy, and therefore hard to keep open. The tunnel level had originally been improperly opened, so that the first stope closed up and all the ore I helped to shovel out was much broken up by the consequent settling.

This settling and the warm climate I supposed to be the initial cause of the high temperature, but the discomfort was due to lack of ventilation. I know from personal experience that as soon as the upraises from the different sections of the first level were connected these hot workings became comfortable. For instance, while Section 2 was so hot that we were supposed to work only one-third of the time, Section 1, exactly similar except for an upraise, was quite pleasant. Also Section 4 was cool while the sill-floor was being opened, due to a fair breeze, but at the third floor it became so hot that an upraise was started at once and pushed with three shifts. The connection cooled the section. The inference that the atmospheric oxidation was the cause of the heat is therefore incorrect.

The main body of the quartz smelting ore was immediately in contact with the gossan. The division was unusually regular, being slightly more level than the ground. I noticed but two oxidized fissures in the sulphides. The lower part of the gossan was also remarkable for the complete absence of copper carbonate or other oxidized copper minerals.

To the south of the rich ore there was a little clayey gossan in contact with what seemed to be kaolinized porphyry, but what I saw was insignificant compared with the great amount in contact with the quartz ore.

I heard of no finding of silver nuggets while I was working at the edge of the gossan, but the rumor said that some of them were found in a short prospecting tunnel driven from Section 3 into the "nondescript material" east of the ore at about the level of the limit of the oxidation. This ground was of the swelling variety and too much timbered and caved for close study.

I have presented this little additional data in so detailed a manner to avoid detracting from its clearness by condensing it, and I hope it will not prove too tiresome.

A. A. STEEL.

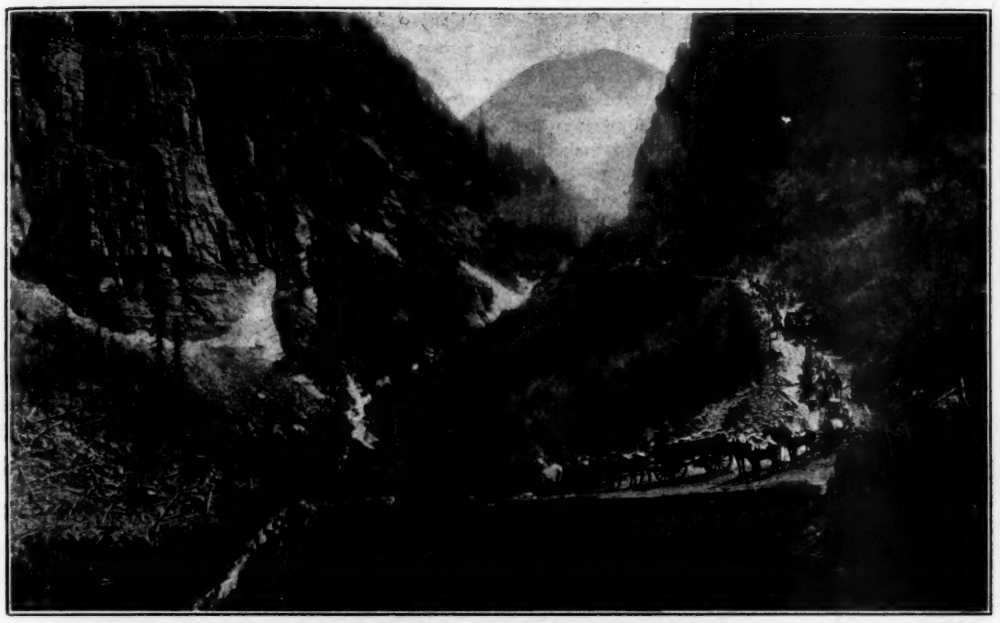
Omaha, Neb., Sept. 3, 1903.

ACROSS THE SAN JUAN MOUNTAINS.

By T. A. RICKARD.

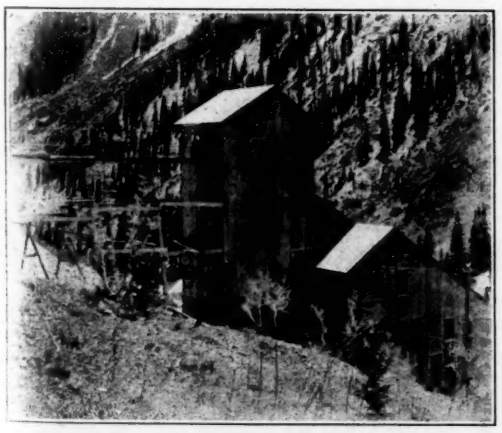
(*Continued from page 424.*)

On the railroad grade, and about a mile from Floresta itself, a promontory of rock gives a magnificent view of the Anthracite and Ruby ranges. To the left are dark pine woods sloping from Ohio peak with an inclination which reproduces the dip of the porphyrite flow and the coal beds underneath; in the middle distance, and contrasting with the dark array



ON THE ROAD TO THE MINES.

of pines, are brilliantly tinted foothills whose rounded contour indicate the softer sandstones of the Cretaceous. Above these rises the abrupt mass of Mt. Beckwith, built of porphyrite. To the right, and coming down to meet the other half of the picture, is the red Ruby range with its serrated comb of dikes, which can be seen extending in jagged line down to the valley itself through which a trout-stream winds in and out until it is hidden by the precipitous face of Mt. Marcellina, a dome-shaped laccolith[1] of porphyritic diorite. Far off, palpitating amid the haze of forest fires, are ranks of distant hills athrob with



THE HENSON CREEK MILLS.

that soft enchantment in which the distance fades from view.

We left Floresta the next morning, September 16, and crossed the Ohio pass, on our return to Gunnison, by a route different to that of our previous journey, which had now taken us around a group of three mountain peaks—Mt. Wheatstone, Mt. Axtell and Mt. Carbon—and from the watershed of the Slate River to that of Ohio Creek, both tributaries of the Gunnison, into which they merge a little to the north of the town itself. Ohio Pass, 10,033 ft. above sea-level, is similar to other mountain crossings; there is a defunct sawmill with an untidy sawdust heap; an abandoned railroad grade, as though engineering skill had failed of breath; a scattering of pines, the straggling procession which is all that is left of the serried ranks that came up the mountain side in proud array until they encountered an invisible bar to further advance—that 'timber line' which, like the shore of an ancient sea, belts all the mountains and marks the upward limit of the conditions favorable to forest growth.

We passed Carbon and Castleton, two coal camps, with all the hideousness which belongs to those unhappy looking settlements; then a short stay, pleasant for man and horse alike, at a roadside ranch, prepared us for a long canter over the wide, dusty road which finally, but we could never tell when, brought us into the unlimited city of Gunnison.

That night at Gunnison we heard the fishermen's tales. It is a great resort for the manipulators of rod and line. It is also a mining center for the surrounding hill country, so that there is no lack of fishy yarns. The unwary will hear of mountains of iron and acres of gold ore; but behind the exaggeration there is the fact that the Gunnison country, with the Elk Mountains to the north and the granitic foothills which lead to the San Juan ranges, to the south, is extremely rich in a variety of mineral wealth—coal, iron, gold and silver—which would have undergone more substantial exploitation if the windy breath of a premature boom had not blighted it in the infancy of its development.

On September 17 we rode from Gunnison to Gate View. The road follows the Gunnison River until it crosses it at Iola, the shipping point of the Vulcan district. Taking a cross-country trail we filed through the sage-bush covering monotonous, low hills, the remnants of granite mountains which had yielded to the leveling hand of Time. Spencer and Dubois, two mining camps, were found almost deserted. Then, surmounting a ridge, we saw again the splendor of the San Juan ranges and the pleasant valley of the Lake Fork. After weary miles of sage-brush hillocks it was singularly refreshing to look upon a landscape through the diversified beauty of which the modifying influence of geological structure could be plainly discerned. At Gate View we passed a night. The name is given to a ranch and railroad section-house by the natural gateway of the Lake Fork, which flows through a gap cut into the andesite. A tongue of this eruptive crosses the broad valley; the river has cut its way through; high, nearly vertical cliffs arise on either side; then steep debris slopes, making a broad V, at the bottom of which the road, the railroad and the river jostle each other for passage; this frames a view of hills rich in the gold and russet of the aspens, surmounted by the high peaks of the San Juan mountains.

Looking through the portals of the river, one is reminded of Ruskin's question, concerning a similar natural structure: "When did the great spirit of the river first knock at those adamantine gates? When did the porter open to it and cast his keys away for ever, lapped in whirling sand?" It is a fine similtude; but geology, with less poetic diction, says that the rock is not adamant to the instrument of erosion as used by the running stream with patient persistence through long time and that no porter was needed to open the gate; the river found it in obeying the laws of its being—gravity—which impelled it to seek the lowest channel and to deepen that channel continually, for fear the onlooking hills should fill it up too fast with their discarded debris.

The road, further on, alternately crosses flat stretches of partially cultivated land and descends into the bed of the stream amid narrow gorges cut into andesite breccia and tuffs, until at the confluence of Henson Creek we rode, amid a sharp downpour of cold rain, into the town of Lake City.

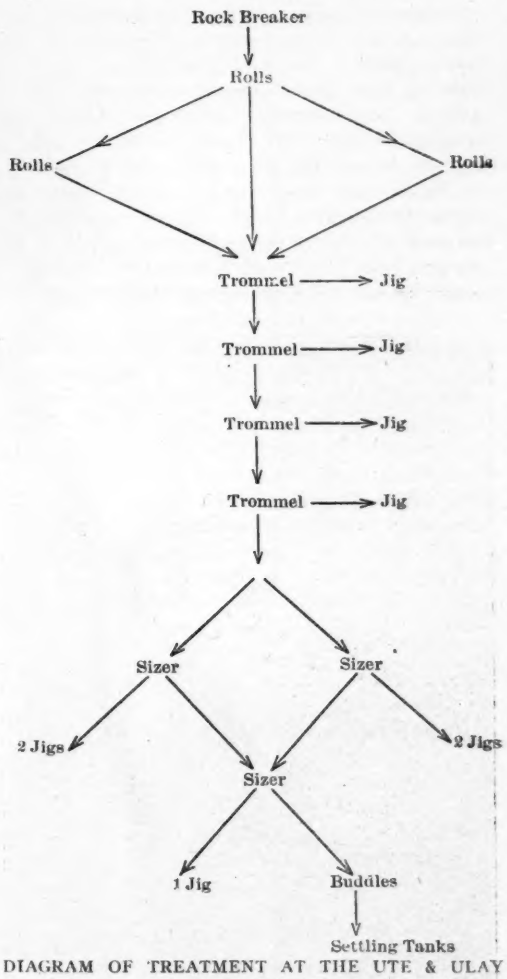
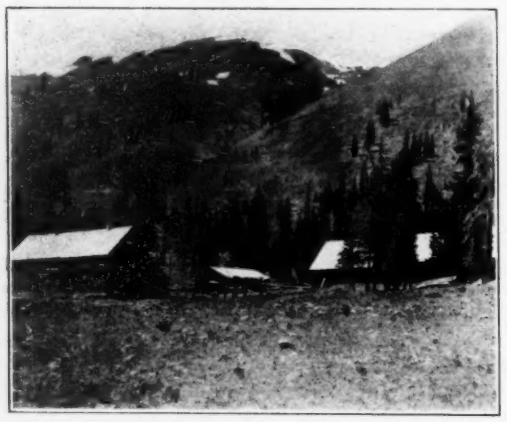


DIAGRAM OF TREATMENT AT THE UTE & ULAY MILL.

We reached Lake City at noon amid a rainstorm which was remarkable for the reason that it was the first bit of bad weather encountered during twelve days. It cleared in the afternoon, so, leaving our horses to rest, we walked the seven miles up Henson Creek to the Ute and Ulay mines. These have been the mainstay of Lake City through all the vicissitudes of the past twenty years. The two veins have been at various times worked both jointly and separately. When I was last here the Ulay lode was the chief source of production; on the present occasion we found that the Ute vein was affording the principal stoping ground. This was above the main adit. The vein is from four to five feet in width; it is a simple quartz-vein containing argentiferous galena. Iron pyrite and zincblende are present in relatively small quantity. The lode is essentially an impregnation following a sheeted band in the andesitic breccia of the San Juan formation and has the characteristics

[1] A laccolith is a body of intrusive lava. It does not spread in dikes or sheets, but gathers into a mass or core, which lifts the overlying strata.

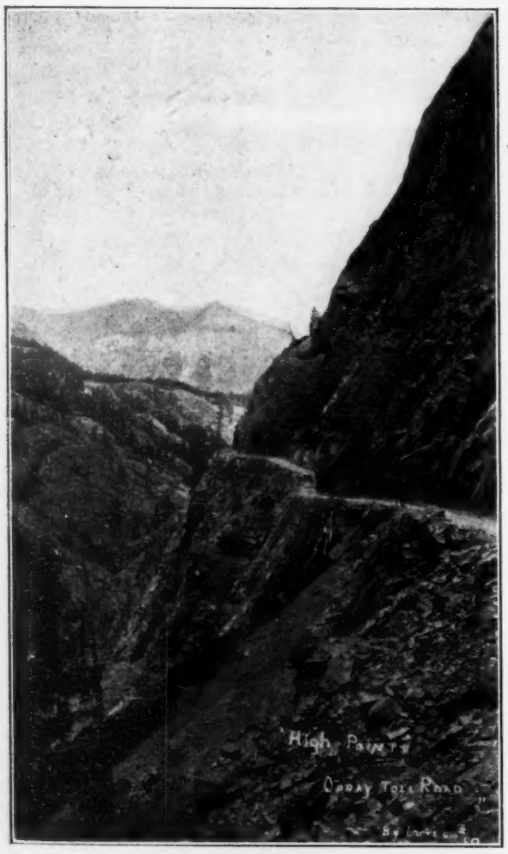
already noted at the Camp Bird, Smuggler-Union and other mines in the same region. Stopes extend, more or less continuously, for half a mile. The Ute dips westward at 63° and is worked in the adjacent California mine. The Ulay had been worked 700 ft. below Henson Creek through old workings which were



ROSE'S CABIN. AN OLD STAGE HOUSE.

in bad repair; a new vertical shaft had just been started to open up the lower ground on this lode.

The mill reminds one, in its method of treatment, of the old Foxdale mine, in the Isle of Man, where, however, raff-wheels are used instead of elevators and the plant is spread over a much larger area. The treatment of the Ute & Ulay ores is simple and well adapted. The mill has a capacity of 90 to 100 tons per day. The ore goes first to a rock-breaker (Blake, 9 x 15) and then to three sets of rolls (Allis-



THE CAÑON OF THE UNCOMPAGHRE.

Chalmers, 16 x 30), then through four successive trommels, 36 in. in diameter and 7 ft. long, which size the crushed ore to 8, 6, 4 and 2½ millimeters. The coarse, which passes through the trommels, goes to the jigs, a double-compartment jig for each trommel. The fines, which escape from the last trommel, pass into two hydraulic sizers, the coarse being sent to jigs while the fines go into a third sizer. The coarse from this last sizer goes to a jig and the fines run to the buddles. There are two plain buddles, 16 ft. in diameter, and four double-deck buddles, 24 ft. in diameter, the tailings from which pass into settling tanks where the slime is arrested. The treatment is illustrated graphically on the diagram given on the previous page.

The concentrates are dried and mixed by passing through a heated revolving cylinder. About 1½ per cent of moisture is left in the concentrates in order to lessen the leakage arising from the bad flooring of the railroad cars, which would be a greater source of loss if the concentrates were dry enough to run readily. The concentrates contain 58 to 61 per cent lead, 13 to 15 oz. silver and 0.05 to 0.06 oz. of gold per ton. They represent about 16 per cent in weight of the original ore and an extraction of about 80 per cent of the lead and 65 per cent of the silver.

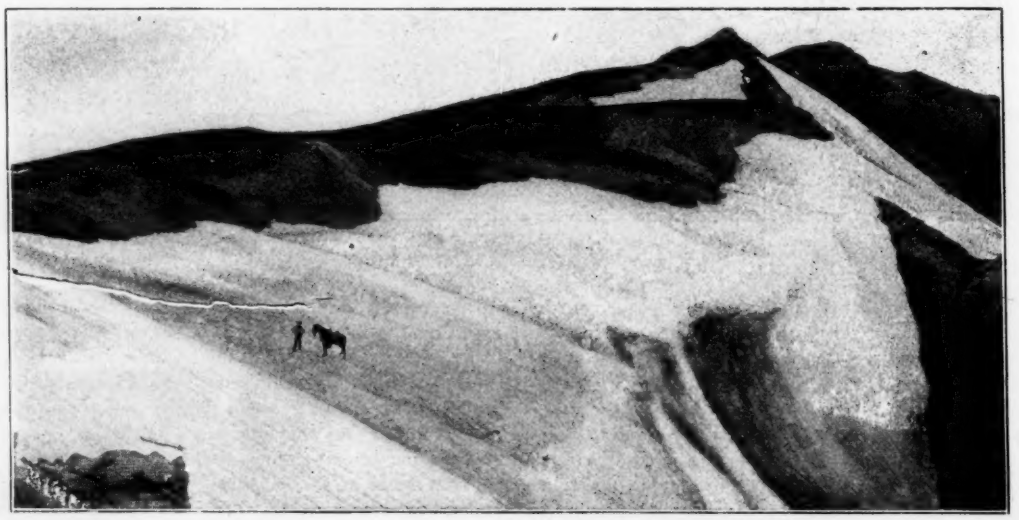
Next day, September 18, saw us started on our final stage, from Lake City to Ouray. Our way took us again past the Ute & Ulay, where we stopped to get some further data from the millman. As we rode along up Henson Creek it was pleasant to notice a good deal of mining activity; we passed under the Bleichert tramway of the Hidden Treasure, past the Moro mill, with a Leschen tram connecting it to an unseen mine on the pine-clad mountain-side and then, just below Rose's cabin, the Bonanza tunnel, with a new mill in course of construction. Mr. Philip Newitt, superintendent of the Henson Creek Lead Mines Company, as it is officially styled, was kind enough to take us underground. The lode is the usual sheeted band of breccia-country carrying four to five feet of quartz, in which gold, silver, copper and lead are carried by copper pyrite, galena and other less conspicuous minerals. The mine afforded an example of the use of electric drills; the Gardner and Durkee were both in use and the superintendent expressed himself as disappointed with them; in each case the motor is carried on a truck and power is transmitted through a flexible shaft. The practical efficiency of the electric drills is a subject too large for a passing comment, but it is fair to the inventors to say that the machines suffer from their unpopularity among miners and the frequent lack of technical skill on the part of the operator. As a rule the first drill tested in a mine is handled by an expert provided by the company which sells the drill; then, results being deemed good by a manager or director, others are ordered. The drill company's man and his skilled assistants depart, leaving a delicate piece of electrical machinery to the tender mercies of a muscular workman who starts with a prejudice against anything new and unfamiliar, and is apt to be confirmed in his prejudice by his own inexpert handling of the machine. This, of course, is, in a way, the drawback to all electrical machinery—it requires workmen who know something about it—but this is an obstacle which the increasing application of electricity will overcome, surely. In the meantime I unite with others in the hope that the electric drill will be further improved, because it can facilitate and cheapen mountain mining to an extraordinary degree.

The new mill, in course of erection, will be operated by electricity, generated at the power-plant, three miles lower down on Henson Creek, where a 6-ft. Hugg wheel does the work. The mill will have a Blake rock-breaker, a Sturtevant crusher and three pairs of rolls. Then will come Bartlett concentrating tables provided by the Colorado Iron Works and Standard tables supplied by Fairbanks, Morse & Co., the latter being also responsible for the general design of the mill.

This pleasant interlude at the Bonanza mine was supplemented by a hearty dinner at the miners' boarding-house before we mounted again.

Rose's Cabin, at 10,850 ft., just above the Bonanza mine-buildings, is a landmark. It was a stopping place in the old days of transmontane travel when long lines of pack mules and horsemen were wont to file up Henson Creek on their way to Silverton, Rico and Ouray. We took the right-hand trail, past the Palmetto mill and along the old grade to the Frank Hough mine.

As we climbed the range the snow-mists gathered, and when we finally reached the crest, at 12,850 feet, the mountains were robed in all the magnificence of the storm. The cold blast from the cañon below swept up to the summit of the range, driving a chilly



GLACIER AT MINERAL POINT.

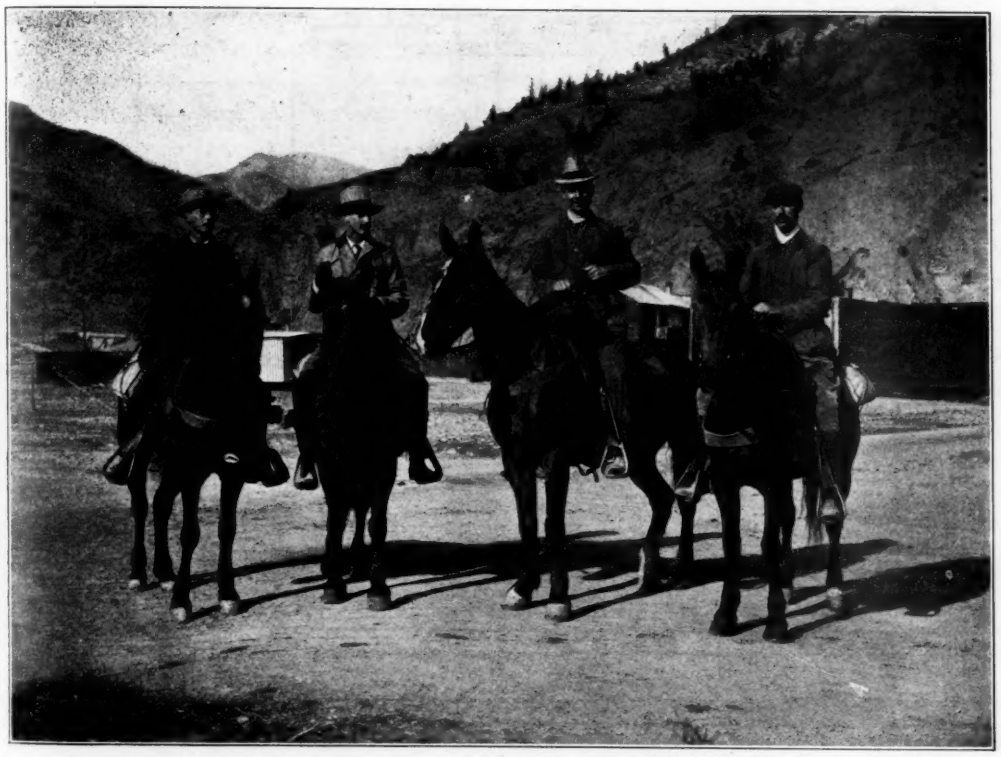
mist which flung itself fiercely around every crag and threw great shadows that stalked swiftly across the darkening slopes. Here and there amid the gloom a lonely peak caught the light, a Titan head above the sea of cloud. Thus we saw old Uncompaghre and the Wetterhorn, besides many another unnamed crest. While we waited, the hail and snow came fast, and so, without further delay, we began the slow descent of the other side, leading and pulling our shivering horses down the tedious talus slopes.

Soon we reached the warmer air of Bear Creek basin, a spacious amphitheater near the timber-line, from which a well-marked trail took us into Bear Creek cañon, a narrow gorge, lined by the most astounding precipices and picturesque to a degree which was astonishing even after two weeks of mountain scenery. The andesite breccia, in nearly level layers, forms cliffs which sweep from an eery height of a thousand feet, and more, down into the hidden bed of a torrent. The sheeted structure, due to parallelism of nearly vertical fractures, is very evident, and the sympathetic structure of the veins, whose croppings are clearly visible ribbing the rock-faces with broken lines of quartz, is apparent even at a distance. We passed the Yellow Jacket and the Grizzly Bear mines, huddled under the beetling brows of breccia cliffs, where, here and there, a cluster of courageous pines hung hungrily for life, or a solitary cabin looked calmly over the abyss, or faint trails in unexpected tracery of line wound in and out of dark ravines with the veritable unconscious air of gentlemen who have no visible means of support.

Our progress, over a trail which was a narrow, albeit quite safe, ledge between rock and torrent, was

necessarily, with horses, a slow business. At length after hours of continuous descent which seemed interminable and gave one a singular feeling of going right into the depths of the earth, we emerged suddenly into full view of the Uncompaghre valley. It is no exaggeration to say that all four of us, some of whom had done our voyage round the world more than once, were amazed at the grandeur of the great picture before us. Scattered already to the four winds, as becomes mining engineers,[2] we shall, I believe, always remember that "polychrome of splendor, an exultation to recall." Ruskin would have rhapsodized and Clarence King could have described it.[3]

The storm had swept northward, the sky was still partly overcast with flying cloud, a luminous atmosphere, pure as inter-planetary space, filled the cañon depths, and from the west the sunlight pierced the lingering mists with mellow light. We stood on a narrow promontory. Across the cañon terraced slopes descended in parklike gradation, resplendent with the livery of autumn, and above their aspen gold the bastions of blue-gray andesite rose tier after tier in Gothic severity of line until belted with the rising



AT THE END OF A 400-MILE RIDE.

mists. Up the valley to the left the winding thread of the river led to the pyramid of Mt. Abram, his sentinel head aglow with sunlight, while further south rose the Red Mountains, shrouded in cold vapor that dimmed their volcanic tints. Straight in front and northward, overtopping these swiftly changing visions of rich coloring and sculptured line, there gleamed the Mt. Sneffels ranges, freshly ennobled with a coronet of snow, with a great passion of light glowing about their lordly summits, while in the darkening east there trailed away "a gray-winged form, the ghost of wind and rain."

It will seem something of an anticlimax to state that the trail subsequently led us to an interesting geological section, where the breccia of the Eocene period was found resting upon the upturned edges of pre-Cambrian slates and quartzite, with only a thin layer of conglomerate, possibly a representative of the San Miguel formation, between them. We reached Ouray before dark, having completed a ride of fully 400 miles.

[2]One is in West Australia, another in California, the third is in Mexico, and the fourth in New York City.

[3]This gives me the opportunity of recommending to my friends that most delightful book of Clarence King, "Mountaineering in the Sierra Nevada," of which a new edition has recently been issued.

METHOD OF CONCENTRATING AT LA CANANEA.

By Martin Schwerin.

On the property of the Greene Consolidated Copper Company at La Cananea, Sonora, Mexico, there was put in commission last winter a concentrating plant, designed for a capacity of 600 tons per day.

Two distinct mines furnish the concentrating ores which differ in their physical characters almost as widely as two sulphide copper ores can. The ore from the Capote mine consists of coarse, agglomerated crystals and finely disseminated crystalline grains of iron pyrite, in a much decomposed quartzose and felspathic gangue. A striking peculiarity of the pyrite is that the surface of nearly all of it is blackened with a microscopically thin film of chalcocite, and on breaking apart the cohering crystals the newly exposed crystal faces, as well as planes of weakness and cleavage, are all seen to be similarly blackened. Such surfaces constantly appear on comminuting a piece down to the smallest particles. A further peculiarity of Capote ore is that the fine crystalline grains most frequently occur in vast aggregates of nearly uniform particles in soft talcy nodules.

The ore from the Veta Grande mine is soft chalcocite, in most irregular bunches and veinlets, in a gangue of massive quartz and partly decomposed feldspars. There are also plastic nodules of a grayish color consisting of intimately mixed kaolinitic matter and earthy chalcocite. Native copper in papery branching sheets fills many interstices of the gangue. Some iron pyrite is present. A small amount of normally hard massive chalcocite occurs in both ores.

The mill, a wooden-framed building covered with galvanized iron, is built in two independent, similar units, on a steep hillside, just below the tracks of the narrow-gauge railroad connecting the mines with the smelting plant. Four ore-bins holding approximately thirty-six hours' supply receive ore from the 30-ton steel cars. A description of one unit follows:

A hand-operated gate in each of the two bins discharges onto separate, fixed inclined grizzlies with slots 1 in. wide. The ore which rolls down the grizzlies piles up on the floor in two heaps equi-distant from a 10 by 20 in. Blake crusher, crushing to 1 in., into which it is shoveled by hand. The crusher discharges into a bin, which also receives the fines from the grizzlies. An oscillating feed device passes the broken ore into an elevator, which takes it to a 5/8-in. trommel, at the top of the mill. The oversize from the trommel falls to a set of coarse rolls, 16 by 36 in., and then back to the elevator and the trommel.

The through size of the 5/8-in. trommel, with which the mill feed can be considered to begin, goes to a train of six trommels of three sizes, in duplicate. The first size is 3/8-in., the next 6-mesh and the last 8-mesh.

The oversize of the 3/8-in. goes to one Hartz jig of two sieves, placed tandem. The oversize of the 6-mesh goes also to one Hartz jig of two sieves similarly placed. These jigs are run with an intermittent hutch discharge which is shoveled into launders, and, with the tailings of these jigs and the through size of the 6-mesh, goes to the 8-mesh trommels. Concentrates from these jigs go to the coarse concentrates elevator and then to a separate bin.

The oversize of the 8-mesh trommels goes to two sets of fine rolls 14 by 26 in., thence to an elevator by which it goes back to the same trommels. The through size of these trommels goes direct to 22 Wilfley tables.

Middlings from each table go back over the same table. Slime-water from head-end of tables and tailings go to waste by way of outdoor settling tanks, from which almost clear water is recovered and used again. Concentrates from tables pass by shaking launders to the upper end of a concrete channel under the floor, running from the foot of the fine concentrates elevator, with a light grade, down to the tailings settling tanks. Those concentrates which settle at once on the floor of this channel are shoveled by hand into the elevator, which discharges into the fine concentrates bin in a line with the bins for coarse concentrates and ore at the back of the mill. An outside elevator is used for loading the concentrates into cars for shipment to the blast furnaces.

The mill described above illustrates an all too common error in ore-dressing in this country, especially in those districts in which the influence of methods pursued in gold milling has left a strong impress. A concentrating table is comprehensively called a "concentrator," and the problem of successful concentration is regarded as solved when a mill is erected containing the "concentrators" of some manufacturer whose reputation for such machinery is good. The problem consists entirely in the choice of concentrators.

This mill is an excellent example of "how not to do it." Four jigs and 44 Wilfley tables erected to treat 600 tons a day! And that, too, on an ore which yields first-class concentrates as coarse as 1¼-in. Even though the coarsest economical concentrate was found to be 5/8 in. (although it is doubtful whether this question was given consideration in connection with the design of this mill), there can be no good reason why one of the products of sizing—the oversize of the 8-inch trommel—should go into the rolls instead of being concentrated. Here is a case of two consecutive crushings of the ore without a concentration between, but with a concentration performed on the next larger size and one on the next size smaller.

As originally designed and operated until March of this year there were no 3/8-in. trommels in the mill. The through size of the 5/8-in. went to the 6-mesh trommel, the oversize of which went to the two double jigs. The feed on these jigs included, therefore, that which was as large as 5/8-in. and that as small as 6-mesh. The size 5/8-in. is equivalent to 15.9 mm., while the 6-mesh used has a free opening of 2.4 mm. Imagine the great quantity of slimes made unnecessarily, especially on the soft chalcocite ores, as a result of crushing these tailings (together with the through size of the 6-mesh trommel) to pass a 1.6-mm. screen.

To avoid an excessive amount of slimes, at least four sizes should be jigged coarser than 8-mesh, and the tailings from each set of jigs crushed just sufficiently to enable them to pass to the next set. The tailings from the fourth set would go to a fifth set, which would get none of the initial ore-feed. By so

doing a large quantity of concentrates are withdrawn, which would otherwise be productive of much slimes were they crushed down to pass the 8-mesh trommel. And yet the latter practice is followed here.

And only slimes should go to tables. The product of a screen should never go to a table without first going to an intervening classifying device in which a jigging size would be separated. The capacity of such jigs is very much greater than tables, and the tailings made would be leaner. But even though this be not conceded there can be no questioning the fact that the substitution of tables for jigs, and the consequent necessity for finer comminution of the entire feed, inevitably results in greater slime production with the attendant loss of mineral, as well as diminished capacity.

Another exceedingly important result of the substitution of tables for jigs is the character of the concentrates produced. Necessarily all concentrates made on the tables are finer than the openings of the trommel through which the table feed comes; in this case 1.6 mm. By making most of the concentrates on jigs it is not uncommon for 65 per cent of *all* concentrates made to be coarser than 1.6 mm. Approximately such results are possible on the Cananea ores without materially affecting their silica contents. The benefits to the smelting operation, where, as in this case, all concentrates are smelted in blast furnaces, and the saving in flue-dust are considerable.

The entire absence of means for settling the table concentrates cannot fail to impress one as a most serious neglect in the design. The concrete channel under the table floor serves to conduct away the water in the concentrates, and with it all such mineral which is too fine to settle in the moving current. The amount of such is a considerable percentage of all the concentrates made. The neglect to save it is wholly inexcusable, since it is part of that already separated from the ore, and the adoption of efficient means for settling all the table concentrates would affect a saving of the labor which is now expended in shoveling them into the elevator. The most natural and the easiest plan is to use bottom discharge bins, using them alternately, one for settling while the other, which is full of concentrates, is being drained and discharged.

The method pursued of running the ore from the bins over the grizzlies and onto the floor, thereby necessitating the services of half a dozen men in reshoveling it, instead of running it into the crusher from the grizzlies, too obviously recalls those pioneer establishments that blazed the way when copper metallurgy was in its infancy. And with a shaking grizzly of good design it is much easier for the attendant (the feeder) to cast aside such pieces of metallic copper which come into the mill and which would cause clogging in the trommels, than it is for the several men, with shovels in their hands, upon whom that duty now falls.

From no point of view can any part of the method of concentrating followed in the Cananea mill be commended. It is instructive, though, as an example of those too frequent metallurgical blunders for which new mining companies are proverbially noted.

Steps were taken by the company to remodel the mill when it had been in commission barely four months. This work is now under way, as well as the erection of an entirely new mill.

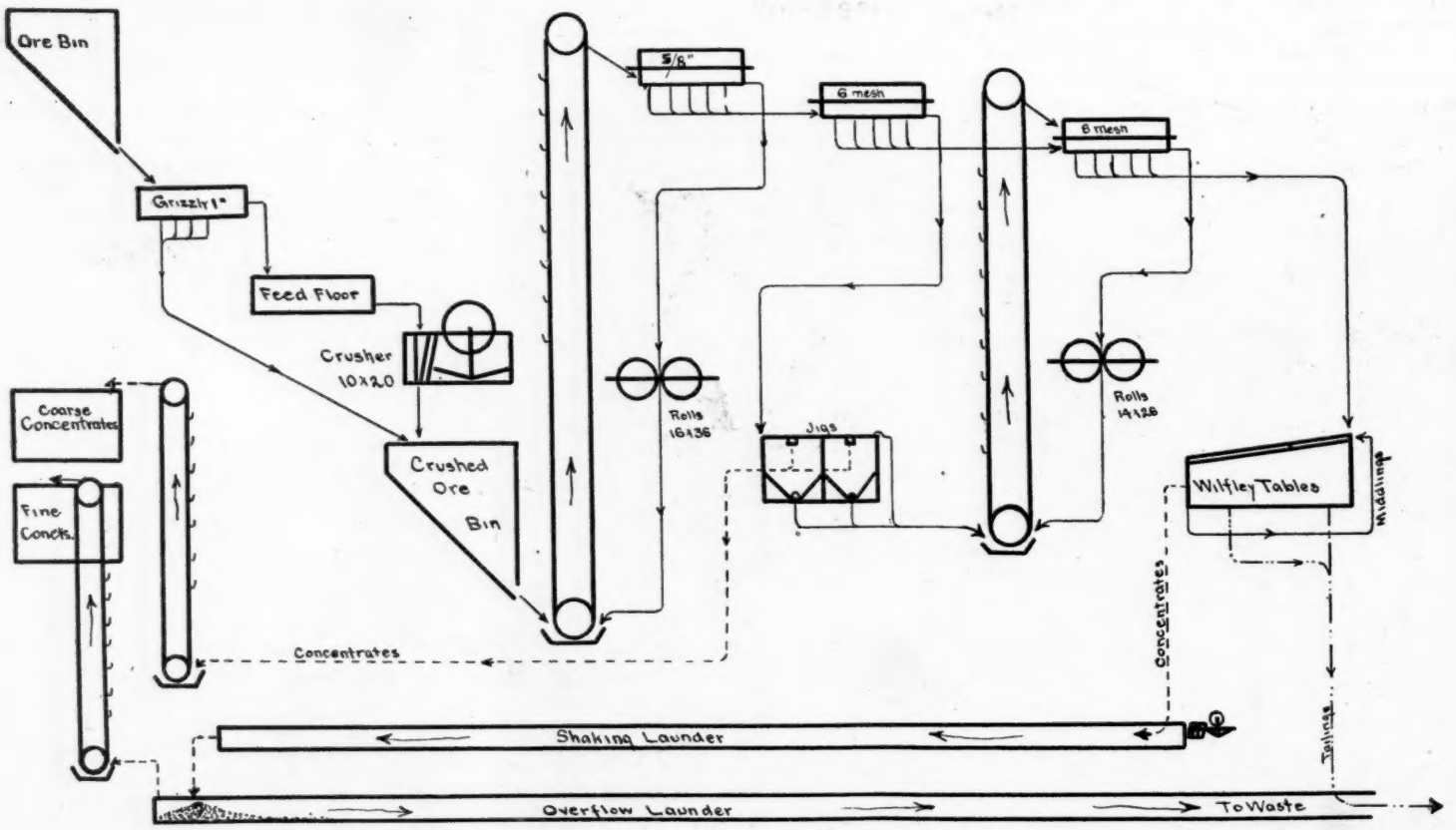


DIAGRAM OF METHOD OF CONCENTRATION AT CANANEA.

DESIGN OF TIMBER TRUSSES.

The overwhelming importance of steel in modern structural work detracts from the engineering interest in timber work, but the latter is nevertheless still largely used, and doubtless will be so long as it is, for many purposes, cheaper than steel. Steel construction has the great advantage over timber in the fact that the strength of the material can be far more accurately determined. Steel and iron are likely to be fairly uniform; the reverse is the case with timber. It is now generally recognized that the data as to the strength of timber determined from small pieces, as given in the older hand-books and text books, are unsafe. Prof. Lanza has concluded from the results of his numerous tests on large, commercial timbers at the Massachusetts Institute of Technology, that the breaking strength of long-leaf Southern pine should not be figured at more than 5,000 lb.; the Division of Forestry of the Department of Agriculture has adopted 4,650 lb. as the basis of its calculations. These new data have not upset old calculations, except in so far as they have made it clear that in assuming a maximum fiber stress of 1,200 lb., the factor of safety is only about 4 instead of 6 or more, as used to be reckoned.

In the ordinary timber truss, wherein the necessary sizes of the various members have been carefully computed, the weakest points are likely to be the joints. Special care should be given, therefore, to the making of the joints as strong as the other parts. This is emphasized in the valuable little book on the "Design of Simple Roof Trusses" recently published by Prof. Malverd A. Howe, which may profitably be studied by the designers of such trusses. Another valuable reference is a paper by Major G. K. Scott-Moncrieff on tests of full-sized timber trusses, published in the *Journal* of the Royal Institute of British Architects, Jan. 14, 1899. These tests were made largely to determine the accuracy of Tredgold's rules as to the proportions and construction of timber trusses, on which British practice has been extensively based, and also to show the actual behavior under a breaking strain of more rationally designed trusses. Various of the latter failed, not by the yielding of any member, but by the shearing of the end of the tie beam because of the defective character of the joint. The tendency to lateral deflection was observed to a marked extent, demonstrating the importance of a well-designed lateral bracing between trusses, which function in a roof is to a considerable degree fulfilled by the purlins. The importance of providing means for tightening the various joints at will was also remarked.

The various conditions for a well-designed roof truss of wood are met by the selection of a suitable and economical form; the proper concentration of strains of triangles and parallelograms of forces, avoiding the introduction of bending moments; the accurate determination of the sizes of the various members, using a safe fiber stress as determined by the recent investigations of different timbers, making due allowance for the condition of the latter, and the intelligent arrangement of the joints. In the last connection, little reliance is to be placed in the expensive and complicated methods of mortising and tenoning prescribed in the older methods of carpentry, but rather on the proper use of iron straps, or bolts and washers, while cast iron parts in the form of brace and rafter shoes, king-heads and queen-heads, etc., are often to be recommended.

FATAL ACCIDENTS IN COAL MINES IN NORTH AMERICA.

By Frederick L. Hoffman.

In my recent annual review of fatal accidents in coal mines in the United States and Canada I called attention to the gradual increase in the fatality rate per 1,000 employed, from 2.53 in 1893 to 3.51 in 1902. The tabulation was limited to the accident frequency in the different States, and no attempt at a detailed analysis was made. In view of the increasing importance of this subject, especially in connection with labor disputes and far-reaching awards by arbitration commissions, it may serve a useful purpose to present some additional facts bearing upon the subject. In the following table the data have been combined for the different coal areas in approximate conformity to geological and topographic conditions. The table confirms an earlier analysis, which will be found in "The Mineral Industry" for 1897:

Fatal Accidents in the Coal-Fields of North America, 1893-1902.

Areas.	Number employees exposed to risk one year.	Number fatal accidents, 1893-02.	Accident rate per 1,000 employees.
Penn. (bitum.), Ohio, Maryl'd.	1,316,608	2,829	2.15
West. Ky., Ind., Ill.	456,341	984	2.16
Mo., Iowa, Kan., Ind. Ter.	303,147	763	2.52
Tenn., East Ky., W. Va., Ala.	457,475	1,509	3.30
Colorado, New Mex., Utah	97,206	755	7.77
Washington, British Columbia.	67,263	578	8.59
Nova Scotia	60,716	119	1.96
Total bituminous	2,758,756	7,537	2.73
Anthracite region, Penn.	1,443,110	4,344	3.01

It is shown by this table that the fatal accident rate for the bituminous coal-field was 2.73 per 1,000 employed during the ten years 1893-1902, against 3.01 for the anthracite region of Pennsylvania. The rate was highest in the Pacific coal-fields, including the State of Washington and the Province of British Columbia. The rate was next highest in the Rocky Mountain coal-field, extending from Colorado and Utah into New Mexico. The lowest rate was experienced in Nova Scotia and the next lowest in Maryland, Western Pennsylvania and Ohio. The fatal accident rate in the adjacent coal-fields of Illinois, Indiana and Western Kentucky was almost the same.

The average rate of 3.0 per 1,000 for the anthracite coal-fields and of 2.7 per 1,000 for the bituminous coal-fields is based upon the total number of persons employed in the coal mining industry. Manifestly the accident liability of persons employed in different occupations must differ materially according to whether the labor is overground or underground, or that of a mine foreman as distinguished from a mine laborer, fire-boss, doorboy, etc. As the result of a careful analysis of the returns for Pennsylvania, I am able to present some very interesting data covering a period of ten years and representing the facts in the case with at least approximate accuracy. The first table will show the true accident liability of persons employed in different occupations in anthracite mines, while the second table will show the corresponding information for the bituminous mines of Pennsylvania. Unfortunately, the lack of uniformity in the preparation of the reports of inspectors for different States precludes a general summary of this kind for the entire coal-field of North America.

ANTHRACITE MINES—PENNSYLVANIA.

Accident Mortality of Employees by Specific Occupations. 1892—1901.

Inside of Mines.

Occupations.	Number employees.	Number killed.	Accident rate per 1,000.
Inside foremen	6,431	30	4.66
Fire bosses	10,062	25	2.48
Miners	352,807	1,978	5.61
Miners' laborers	245,893	1,122	4.56
Drivers and runners	101,231	379	3.74
Doorboys and helpers	31,370	84	2.68
Other employees	163,093	299	1.83
Total inside	910,887	3,917	4.30

Outside of Mines.

Occupations.	Number employees.	Number killed.	Accident rate per 1,000.
Outside foremen	4,135	4	0.97
Blacksmiths and carpenters	22,545	17	0.75
Engineers and firemen	43,405	35	0.81
Slate pickers	235,670	102	0.43
All other employees	206,756	383	1.85
Total outside	512,511	541	1.06

BITUMINOUS MINES—PENNSYLVANIA.

Accident Mortality of Employees by Specific Occupations. 1892—1901.

Occupations.	Number employees.	Number killed.	Accident rate per 1,000.
Mine foremen	7,462	21	2.81
Miners	631,374	1,383	2.19
Laborers	22,792	107	4.69
Drivers and runners	51,505	147	2.85
Doorboys and helpers	12,967	17	1.31
Other employees	33,495	171	5.11
Total inside	759,595	1,846	2.43

Outside of Mines.

Occupations.	Number employees.	Number killed.	Accident rate per 1,000.
Blacksmiths and carpenters	11,804	1	0.08
Engineers and firemen	12,147	18	1.48
Other employees	124,400	30	0.24
Total outside	148,351	49	0.33

According to these tables the inside accident liability of persons employed in anthracite mines is 4.30 per 1,000 against 2.43 for persons employed inside of bituminous mines. The anthracite miners experienced the highest accident mortality, being returned as 5.61 per 1,000 employed, against 2.19 for miners in bituminous mines. In curious contrast it is shown that laborers in anthracite mines have a lower accident liability than miners, while the contrary is true for bituminous mine laborers with more than twice the accident rate of miners. Drivers and runners show an accident liability of 3.7 per 1,000 inside of anthracite mines and 2.9 per 1,000 inside of bituminous mines. Doorboys and helpers show an accident liability of 2.7 per 1,000 employed inside of anthracite mines and of 1.3 per 1,000 inside of bituminous mines. The group returned as "other employees" is rather too large to serve a useful purpose, and it would seem that a more detailed return could readily be made, so that more accurate information would be available.

A comparison of the accident liability of persons employed in coal mining with other hazardous employments may be of interest. The table which follows shows the fatal accidents per 1,000 persons employed in different occupations or industries, being necessarily limited to the more important branches:

FATAL ACCIDENTS IN VARIOUS OCCUPATIONS.

	Period.	Rate per 1,000.
Railroad brakemen	1900-02	15.8
Gloucester fishermen	1892-00	13.2
Gunpowder manufacture	....-00	10.5
Railroad switchmen and flagmen	1900-02	7.2
Railroad firemen	1900-02	7.2
Railroad engineers	1900-02	6.8
Dynamite manufacturers	....-00	6.7
Railroad conductors	1900-02	6.1
Anthracite coal miners	1892-01	5.6
Bituminous mine laborers	1892-01	4.7
Anthracite mine laborers	1892-01	4.6
Lead and zinc miners of Missouri	1892-01	3.3
Metal miners of Colorado	1896-01	3.2
Copper miners of Montana	1891-00	2.8
Anthracite fire-bosses	1892-01	2.5
Paid firemen in cities	1885-00	2.5
Bituminous coal miners	1892-01	2.2

It is shown by this table that railroad brakemen have the highest fatal accident figure, being respectively 15.8 per 1,000. Next in the order of importance come persons employed in the Gloucester fisheries and those employed in the manufacture of gunpowder. All the important railway employments show a higher fatal accident rate than the various branches of the coal mining industry. For the metal mines of the Western States we, unfortunately, have not the details for the different occupations and the rates are therefore given in the aggregate. It is, however, safe to assume that inside miners and mine laborers in lead, zinc, copper and gold mines would show a higher relative fatal accident rate than coal miners if the data were available. In a general way, the table shows that coal mining is not as dangerous an occupation as railway transportation.

Coal mining, however, is a hazardous employment which calls for the most painstaking supervision to guard against the needless waste of human life. Much remains to be done to bring this occupation, in all its branches, into harmony with the conditions of modern civilization, in which each human life has a distinct financial, economic and social value. A careful study of the facts in the case would seem to warrant the conclusion that there is considerable room for a material improvement in the conditions affecting the safety and health of the army of men employed in coal mining operations in this country.

A RUSSIAN EXPOSITION.—An exhibition of industrial art in metal and stone products is to be held in St. Petersburg next November. The chief object is to make the public acquainted with the progress of Russian industry.

THE MINES OF THE PINITOS AND AZUL MOUNTAINS, SONORA, MEXICO.

By REGINALD W. PETRE.

The Pinitos Range commences a little southeast of Nogales, Arizona, the main ridge trending southerly for about 30 miles, then dipping off to the valley of the Coscopera River and reaching an elevation of about 7,000 ft. above the sea.

At first sight it appears to be very strange that any gold-fields lying only a few miles south of the international boundary, between Nogales and Cananea, and within 12 miles of the Guaymas railroad, should be practically unknown and undeveloped. The explanation, really simple and well understood in the neighborhood, is, that until the effective imprisonment of the Apaches on their reservation, these mountains, well watered and abounding in game, were their southernmost asylum when chased by the United States troops, while later they offered a safe retreat to the equally warlike Yaquis, now practically exterminated.

Forty-five years ago the Coscopera Mission, built upon a low *mesa* at the junction of the river of that name with the principal drainage valley from the Pinitos, then in a most prosperous condition, was raided by Arizona Apaches, and after a siege of many weeks more than three hundred persons were slaughtered, but their coveted treasure was never found. The Yaquis were then attached to the Mission, and this rich valley was kept in a high state of cultivation, while the *padres* worked many gold placers in the valleys of the Pinitos to the north and several silver mines in the Cerro Azul to the south. Therefore it was expected that the accumulated treasure would be great; and even to-day the ruined church shows late excavations in the very graves and shrines beneath the fallen roof, where vandals still seek the undiscovered riches of the *frailes muertos*. The recollection of this massacre deterred even the most venturesome prospectors for years; then the raiding Apaches again appeared, and when the once peaceful Yaquis declared their independence of Mexico, it remained a forbidden ground to the whites, until four years ago a small party entered the range and commenced to prospect in the virgin forest; this resulted in the discovery by C. W. Hays of the gold veins now being operated by his company.

TIMBER ON PINITOS MOUNTAIN, SONORA, MEXICO.

The northeastern slopes and valleys of the mountains are covered with a magnificent growth of pine, embracing probably 50,000 acres, carrying from three to seven thousand ft. of timber to the acre, with some trees as much as 5 ft. through and 100 ft. high, the great value of which in the State of Sonora can easily be imagined, particularly as in the valleys every tree will make from one to two logs of clear lumber, becoming proportionately coarser as elevation and exposure are reached. Geologically, the mountains have a granite base with capping of andesite over 1,500 ft. thick, which, among the southerly peaks, is intersected by mineralized fissures running principally east and west, but pitching at all sorts of angles from blankets to vertical veins, and though but comparatively few have as yet been located, owing to the difficult nature of the country and depth of debris, each one shows high gold or copper values. In the Independencia No. 2, a blanket vein, conforming rather closely to the slope of the hill, now being opened to supply the stamp-mill, 14 ft. across the vein, sampled $71, with an average width of 7 ft. and milling value of $30 per ton. Another blanket vein, the La Paz, gave $58 for 6 ft., and is traceable through the mountain top for two miles, while two vertical veins showed an average of $10, in one case for a thickness of 25 ft. The quality of the mill bullion is very high, going $19 per ounce, and the gold is generally rather coarse and easily amalgamated. It is found directly associated with quartz stringers, in the thoroughly oxidized vein-matter, but I found values as high as $50, 2 ft. in the footwall, within apparently barren rock. At the time of my visit the work done on the vertical veins was too limited and shallow for any reasonable guess to be made as to where the water level would be: in the Oro Blanco, a 30-ft. shaft shows some unoxidized ore at a horizon considerably higher than any of the other workings. On the southwest flank of the range copper veins carrying silver predominate, yet shallow placers near the Durazno copper vein gave very large well-rounded gold nuggets which looked as though they had been transported a greater distance than would be possible with the present topography. In the larger cañons trending east there is usually a constant supply of water, especially where the Hays camp is situated, and no doubt this will continue until the mountains are stripped of timber. Northeast of this camp no payable veins have been found, though the formation throughout is identical, so more careful prospecting is likely to develop values.

Traveling eastward down the steep trackless spurs from the Hays camp, we catch sight of the smoke of the Greene Consolidated Copper Company's smelters through a notch in the Cananea Mountains, seventeen miles distant, and after stumbling over a vast talus of strange rounded granite boulders, enter a narrow valley six miles long which drains the richest exposures of the Pinitos and shows unmistakable evidence of good placers, for here and there are pits in the gravel where Mexicans work in the rainy season, but no signs of the former extensive works. The valley widens till it joins that of the Coscopera at the foot of the ruined Mission church, and three miles south across the river rise the Azul Mountains, a nearly treeless, grassy range with central peaks over 7,000 ft., into the heart of which winds an admirable trail constructed by the Mission fathers for packing out silver ore from the mines already alluded to. The rock formation is the same as that of the Pinitos, only the granite core rises to within 500 ft. of the summits, which are capped with andesite. In the latter rock only silver veins are found, the gold being in nearly flat fissures in the granite, only a few feet below the contact, and I am inclined to think one at least follows the contact, though the exposure was too broken up to be able to trace it with certainty. The work done on the gold veins is very superficial and incorrect, so only guesses can be made as to their permanence, but the grade of the oxidized ores is very high, showing free gold with a little galena and traces of copper, and apparently paid well to work in the group of little *arastras* belonging to the Esperanza.

The Magdalena silver mine has a very strong vertical fissure in which the ore has been cut by adits at three levels (the distance apart I was unable to ascertain, as my barometer broke down at this point), and were re-opened two years ago, after remaining untouched since the massacre of the Mission. In a recent cave above the lowest level I found 16 in. of sulphide ore which assayed 820 oz. of silver, evidently being the shoot on which the old work was being done. The Gran Fortuna, a mile distant, was another of the Mission mines, where the ore occupies a fissure in andesite 10 ft. wide opened by a shallow inclined shaft and adit; this probably had just been opened, or the ore, running from 10 to 200 oz., chiefly in silver carbonates, was not suited to their method of extraction. Water is rather scarce in this locality, but some 15 acres of the valley nearby could be converted into a reservoir by a short dam, especially as there are no traces of the disastrous cloudbursts which have devastated the Pinitos. From a pastoral point of view this vast untouched stretch of bunch-grass hills is very attractive. Transport is comparatively easy, as a good road is possible to the valley below, where it would meet those now in use to the railroad and Cananea.

Labor is at present scarce and indifferent, while wages are very high for Mexico, chiefly due to the proximity to the boundary and the large operations going on at Cananea and Nacosari.

In this region we are separated from the United States only by an imaginary line, thirty miles distant; but we live under industrial conditions so diametrically opposite that one may easily imagine himself to be in the Cordilleras of the Andes. The mine operator is permitted to go his own way in peace; the miner receives his wages, as agreed upon, without the impudent intervention of the walking delegate. The Mexican Government has thrown open its wonderful riches of the country to those who care to invest their capital in the Republic, and has guaranteed them full protection; best of all, it keeps its faith vigorously. The strike was started last spring, at Cananea, among some American employes, who endeavored to stop the operation of the smelters in the most approved Colorado style, but Colonel Kosterlitzky, Commandente of the Magdalena district, who is well known throughout Sonora for his thoroughness, simply arrested the dissatisfied men and escorted them across the border as undesirable citizens.

Unfortunately, a liberal interpretation of the mining law regulating prospecting concessions has resulted unfavorably. A large part of the most promising gold-fields of Sonora, and especially of the Pinitos and Azul Mountains, has been practically closed to independent prospectors for the benefit of a single foreign corporation, which owns far more property than it can possibly take care of. Very little real push has been shown so far, and, with the exception of a wagon road from the railroad, nothing of any importance has been done. The value of the mines has by no means been tested. This, however, is nothing singular, for all new mining districts have the ordinary course of development by bull punchers, lumbermen, bookmen, and finally, miners; and this will be no exception because so many openings show such good values.

BLAST FURNACE SMELTING WITH CLASSIFIED ORE.—E. Belani in *Stahl und Eisen*, 1903, XXIII, page 777, expresses the opinion that many irregularities in blast furnace smelting are due to the different sizes of the pieces of ore. Such difference of sizes is of great influence upon the density of the charge, affecting both its penetration by the gas and the distribution of heat. The reduction of the ore bears a direct relation to the size of the piece. While the coarse ore is being reduced, the fines have to remain unnecessarily long in the shaft, leading to an increased consumption of fuel, etc. An experiment was made in running two furnaces, of the same construction, on the same material, which in one case was unclassified and in the other case was classified. The first furnace made only 600 kg. of iron per cubic meter, and had continually to struggle with difficulties, while the two furnaces produced 1,000 kg. per cubic meter and consumed 20 per cent less fuel. In other cases, by attention to this principle of regularity in the charge, the production of a furnace was increased from 60 tons per day to 100 tons.

TREATMENT OF CONCENTRATES ON THE RAND.*

By H. S. DENNY.

Present Conditions.—In July, 1899, there were 14 companies, out of 77 producing companies, making and treating concentrates; eight of them were using the cyanide process and six chlorination. In that month over 4,000 tons of concentrates were treated, out of about 800,000 tons crushed. Only one company had its own chlorination plant of the six whose concentrates were chlorinated, the practice in the cases of the other five being to sell the concentrates to chlorination works. Of the total tons crushed the percentage treated as concentrates is therefore about 5 per cent, and as the average percentage throughout the Rand would be something like 3, there is obviously a divergence of opinion as to the utility of the operation.

The object of concentration is primarily to separate a certain percentage of the pulp containing a large proportion of the average gold content, from the balance of lower grade pulp, and the reason for this separation is that the treatment adapted to the lower grade portion is not so successful on the concentrates so separated, and an independent treatment is therefore called for. Expressed in other words, the question resolves itself into the statement that, whereas, in certain cases, by adopting concentration we are able to secure an average recovery of, say, 88 per cent. of the total gold in the pulp, we cannot, without its employment, obtain, say, more than 78 per cent. Accepting this statement as being approximately accurate, it follows that the additional extraction obtained must represent a greater margin of profit after payment of all the expenses entailed in the entire operation than would result from the ordinary treatment without concentration.

We thus have the value of concentration defined as the increased profit resulting from a higher gold extraction after payment of all expenses. In considering the application of concentration the points are:

(1) The percentage of concentrates,

(2) Value of the concentrates, and,

(3) Their amenability to the ordinary cyanide treatment as used for sands.

Taking the case of a running plant, it is not difficult to determine these three factors. The first two can be estimated from the daily pulp sample, and the third from the residues discharged from the cyanide vats, and the settled slimes. In fact, the assay-value of the two last-mentioned products could in almost every case be taken as a guide, seeing that if they are high there must be some refractory constituent in the ore which requires special treatment. To test this, careful pannings should be made of both the residues and slimes and the resultant concentrates assayed, and in almost every case, according to my own experience, it will be found that these concentrates are responsible for the high value.

Although the banket ores of the Witwatersrand Main reef series may be justly described as being remarkably uniform in mineralogical character, they possess physical variations which affect their metallurgical treatment.

First, there is in point of hardness a very material difference, as, for instance, between the Roodepoort United Main reef and the New Goch mines, and this is well illustrated by a recent trial in which a skilled hammer boy bored 6 ft. at the former mine in 2 hrs. 40 min. as against from 5 to 8 hours at the latter mine, and at the mills (at these mines) crushing to about 25 mesh (600 holes per sq. in.), we find that a larger proportion of the pulp will pass through 90 mesh at the Roodepoort United than at the Goch. At Roodepoort, too, we have to deal with a larger percentage of slimes.

Secondly, we find that the pyrite on one mine shows a greater tendency to slime than on another.

Thirdly, we have established the fact that, whereas the pyritic constituent at one mine readily yields its gold content to the ordinary cyanide treatment—owing to the fact that it slimes easily—we can in other cases only obtain a low extraction.

Fourthly, the pyritic constituent at one place is under 2 per cent, whilst in another it is over 4 per cent.

Fifthly, even in high-grade ores the concentrates may have on one mine a very high gold value, and in others a comparatively low one.

It is clear that in consequence of these differences the treatment at one mine may vary considerably from that at another, and yet both may be doing satisfactory work. Given 3 per cent clean concentrates assaying 5 oz. per ton from which the ordinary cyanide treatment will only extract 50 per cent, concentration and independent treatment must be adopted, while, on the contrary, granting that a high extraction, say 90 per cent, could be obtained in the ordinary way, concentration is unnecessary. Between these two extremes there are many intermediate stages which demand great care in determination. The high cost of concentration prohibits the treatment of anything but high-grade concentrates, seeing that as the value of the concentrates is diminished, the greater is the comparative cost of treatment on the gold recovered.

At the present time at the New Goch we make between 180 and 220 tons of concentrates in a month, varying in value from 4 to 6 oz. We sell these concentrates to a chlorination works which gives us 82 per cent of the value on anything over 5 oz., taking the gold at $19.20[1] per oz. On 5 oz. concentrates, worth about $100.80 per ton, we pay 18 per cent of $96, equal to $17.28, plus transport and other charges, bringing the total to about $19.20, equal to $5.04 per oz. On 4 oz. concentrates we get 80 per cent only. One ton is worth about $81.60, while we get 80 per cent of $76.80, less charges, resulting in our receipt of about $57.60 per ton, or a loss on treatment of about $6 per oz.

The charges above given are for treatment only. The cost of concentration must be deducted from the return given, and this I deal with elsewhere. On 20 oz. concentrates we have a value of $408 per ton, and as the percentage allowed us would probably not represent more than $19.20 cost per ton the proportion becomes very small. One oz. concentrates would not pay for production and treatment by chlorination process. The high cost of the process, therefore, limits its use to the treatment of high-grade concentrates, and even on the latter the charge is abnormally high.

Treatment of Concentrates. One of the chief objections to concentration is undoubtedly the difficulty and expense of treating the resultant product, and even to-day we find no material improvement in this respect over the practice of ten years ago.

The chlorination process, though an ideal one from the metallurgical aspect, is, as before shown, too expensive for anything but high-grade material, and even on a 5-oz. concentrate absorbs a very high proportion of the value on account of treatment.

In the matter of extraction nothing could be more satisfactory for the reason that, whether the value of the charge be 1 or 10 oz., an extraction of about 98 per cent may be looked for. Doubtless the cost could be materially reduced if a group of companies, all of them adopting concentration, could agree upon the erection of a joint works; but, as before intimated, the number of such companies is comparatively small, and such a scheme is therefore hardly feasible, whilst for any individual mine the initial outlay would be so heavy as to make the advantage extremely doubtful.

We have, of course, the cyanide process, which in some cases, on a charge containing about 20 per cent of concentrates, will, given a long treatment, show an extraction of 90 per cent, but in others the yield does not reach 50 per cent.

The desideratum is an extraction equal to that of the chlorination process with a consistent low working cost brought down to the plane of cyanide treatment. This proposed reduction in working costs immediately eliminates the chlorination process from the range of possibilities, seeing that the charge for calcination alone comes to something like $4.80[2], and we must therefore turn our attention to some other method. Before elaborating this point further, however, it would perhaps be well to consider what the initial difficulties of the case are.

It is, I believe, agreed by the majority of chemists to-day that the nature of the association of the gold and pyrite in our concentrates is a purely mechanical, and not a chemical one; that is to say that, given a sufficiently complete disintegration of the pyrite, the whole of its contained gold will be liberated in the condition of what is termed free gold. Accepting this statement as correct, it is yet impossible to say how fine it would be necessary to grind the pyrite in order to free the whole of the gold, as in all probability, after releasing 99.9 per cent of it, the final 0.1 per cent, or a portion of it, would be so minute as to defy any grinding medium. We are, however, concerned more with the practical aspect, and for this the percentage named will suffice.

It is clear that if a particle of gold is encased in a solid piece of pyrite through which no cyanide solution can percolate, we cannot hope to dissolve that gold by immersing the pyrite in such a solution; and following on this statement, it is equally clear that our extraction would vary according to the percentage of gold liberated. In the chlorination process we first of all conduct the operation of calcination, which leaves the pyrite in such a condition that the chlorine solution can easily gain access to all particles of gold which were originally encased, and hence the high extraction; whereas, in the cyanide treatment it has been customary to deal direct with the concentrates without resorting to any preparatory measures, with the result that as the solution does not affect the pyrite the encased particles of gold are apt to escape the action of the solvent.

I am convinced that to this feature, apart from the question of the difficulty of percolation when treating clean pyrite charges, may be ascribed the scanty success that has so far characterized the attempts to treat concentrates by cyanide solution, and it is also responsible for the fact that many mines have not employed a concentration plant, whilst others pay a very high premium for the use of the chlorination process. I propose now to briefly describe some experiments which have recently been conducted at the New Goch gold mines, where, as before stated, we use a Frue-vanner concentrating plant, from which, when running 60 stamps, we obtain over 200 tons of concentrates per month, worth between 4 and 5 oz., the treatment of which by chlorination costs us about 24.7 per cent of the gross value.

Before entering into the details of these experiments it may be of interest to state that, after careful investigation, I found that the gold contained in the sulphurets in the ore on the West Rand was more readily extracted when treated in conjunction with the sands by ordinary percolation treatment, than that in the sulphurets on the East Rand.

The first tests conducted to determine the practicability or otherwise of treating the Frue-vanner concentrates from the New Goch mines by cyanide were by ordinary percolation, using varying strengths and quantities of solution. In none of these were satisfactory results obtained, although in each case a full month's treatment was given. After carefully considering the evidence when summarized we arrived at the following conclusions:

(1) That weak solutions did not dissolve the gold sufficiently rapidly (increased strength of solution, even toward the end of the treatment, invariably resulted in increased rate of extraction).

(2) That with the use of strong solution the consumption of cyanide became abnormal.

(3) That increased volume of solution did not greatly accelerate the extraction.

*Abstract from advance sheets of paper entitled "Observations on the Metallurgical Practice of the Witwatersrand," read before the Chemical, Metallurgical and Mining Society of South Africa.

[1]English money has been translated into United States currency on the basis of £1 to $4.80, and 1 shilling to 24 cents. —EDITOR.

[2]Mr. Denny says "20 shillings," but in this country $1 would be a fair figure for roasting. The difference is due, presumably, to high wages and cost of supplies at Johannesburg.—EDITOR.

(4) That any given strength of solution dissolved a gradually diminishing amount of gold; that is to say, that there was no great disproportion between the percentage amount dissolved by the first solution as against the last.

(5) That simple percolation gave very low extraction.

(6) That the condition of the concentrates as ordinarily produced by mills was such as to render a high extraction on this system impossible.

One curious feature of this experiment was that in the upper layer of the experimental vat the extraction proved to be much higher than in the lower.

The result of one of the tests, in which 0.4 per cent solution was used throughout, is as follows:

Assay value of charge (200 lb. weight)..149.4 dwt. per ton
Assay value of residues..... 42.2 dwt.
Extraction ..... 71.62 per cent
Consumption of cyanide..... 20.56 lb. per ton

In this case the rate of solution gradually diminished throughout the treatment, being about 50 per cent lower at the end of the 28 days' treatment as compared with the first day. When it is considered that the amount of gold contained was also diminishing it will be seen that there is no great disproportion in the percentage extraction per day. The experiments throughout were conducted on newly made concentrates to which an alkaline wash was given prior to treatment.

Having convinced ourselves that by this method we could not expect to obtain a satisfactory extraction, it was decided to turn our attention to a further set of experiments in which the chief feature should be agitation. In this respect we were fortunate in having the services of Mr. T. H. B. Wayne, a highly qualified metallurgist and chemist, who had had considerable experience in experimenting on West Australian ores on similar lines, and the subsequent experiments were conducted under his supervision.

Agitation with cyanide and bromo-cyanide solutions is by no means a new idea, having been tried in New Zealand, Australia, California and elsewhere. For a number of years it has been used in the treatment of slimes in both the decantation and filter-press processes, and also in several chlorination processes. It is also used in the Reicken process, where the whole of the roasted ore is treated by agitation in cyanide solution, but I am not aware of any plant running to-day where it is used in the treatment of clean concentrates.

It may be taken as an axiom that the rapidity of the solution of gold in contact with cyanide solutions is improved by increase of temperature, pressure and agitation, and the results of some experiments have shown that this acceleration amounts to as much, in some cases, as four times the rate obtained by solutions at ordinary temperature. With this increased action, however, there is always an increased consumption of cyanide, and I, personally, believe that equally economical results can be gained by agitation without heating. We, therefore, decided to dispense with the factor of extra heating in our experiments.

The material on which the first agitation tests were conducted consisted of vanner slimes, which represent the finer products caught by Frue-vanners, and the following statement gives the results of a series of experiments made under varying conditions, from which it will be observed that in many cases a high extraction was obtained in a short period.

From these results we made the following deductions:

(1) That given an ample supply of the solvent (KCy in the presence of O) when fresh concentrates are being treated, the use of lime or caustic soda may be dispensed with.

(2) That the presence of fairly coarse gold is not a serious objection where agitation is used, although I am of opinion that in all cases it would be advantageous to pass the material over copper plates prior to agitation treatment (i. e., if the concentrates have been re-ground).

(3) That the apparently slow solution of the gold toward the end of the treatment is, to some extent, due to the reduced strength of the solution, but, in the main, it may be ascribed to the reduced area of the particles of gold coming in contact with the solvent. Naturally, some of the gold is more or less encased in crevices in the particles under treatment and the solution of such particles would be slower.

(4) That, finally, the rapidity of the solution depends on:

(*a*) The liberation of the gold by fine grinding.

(*b*) The strength of the solution.

(*c*) The volume of the solution.

The factors regarding solution will be found to vary in practice according to the particular material being treated. Referring again to the above tabulated statement, it will be noticed that in some cases the results contradict each other. For instance, in case H both lime and lead acetate were used with apparently no prejudicial effect, but in cases S and T they would appear (when used together) to reduce the extraction materially. In cases A, B, C, D and E the consumption of cyanide varies with the ratio of the weight of solution to the weight of the charge. This, however, is not confirmed in the cases K, L, M and N. Other deductions that follow are:

(1) Of the three strengths of cyanide used (0.5 per cent, 1 per cent and 2 per cent), the 1 per cent solution shows the best results, and practice would probably confirm this.

(2) The use of oxygen instead of air in conjunction with the solution during agitation does not appear to be of much, if any, benefit, provided arrangements are made to give a free supply of air to the charge while under treatment.

(3) In all probability the limit of extraction possible under the conditions is obtained in less than 3½ hours.

(4) A small variation in the force of agitation does not show any conspicuous difference in extraction.

The charges under treatment averaged a fineness equivalent to 97 per cent passing 90 mesh.

The following are examples of some of the subsequent laboratory tests:

Hot v. Cold Solutions.—1. Hot, 7.82 oz. extracted (by solution assay). Residue 4 dwt. Extraction in 3 hours 97.5 per cent.

Cold. 7.10 oz. extracted (by solution assay). Residue 4 dwt. Extraction in 3 hours 97.2 per cent.

These results are so near that no definite statement can be made as to which would produce the higher extraction if 3 hours were allowed in practice. Previous results showed that the solution of the gold in the case of the hot solution is much the more rapid, and probably in the above experiment over 90 per cent had been dissolved in the hot solution in the first half hour.

2. The second test gave very similar results, the residue assays being exactly the same as in the previous case and the charge assays almost the same also.

The extra consumption of cyanide per ton of ore in the case of heated solutions (1 of ore to 1 of solution) was approximately 3 lb.

Proportion of Solution to Ore.—A series of laboratory tests were made with a view to determine the best working proportions of solutions to ore to use in practice and the most suitable strength of cyanide solution. The time of treatment in every case was 4 hours and the material treated vanner slimes. Each test was done in duplicate. The results were as follows:

First Series.

No. of test.	Strength of solution, per cent.	Assay value solution, per ton of ore, oz.	Assay value residues, oz.	Extraction, per cent.	Consumption of KCy, lb.
1	0.2	7.45	0.42	94.7	2.4
1a	0.2	7.59	0.45	94.4	2.4
2	0.4	7.47	0.27	96.5	4.5
2a	0.4	7.73	0.26	96.7	4.5
3	0.6	7.71	0.24	97.0	4.7
3a	0.6	7.85	0.21	97.4	4.7
4	0.8	7.76	0.18	97.7	5.4
4a	0.8	7.45	0.17	97.8	5.4
5	1.0	7.83	0.17	97.9	6.2
5a	lost.				

Second Series.

1	0.21	4.98	1.35	78.7	1.65
1a	0.21	5.20	1.35	79.4	1.65
2	0.4	5.19	1.20	80.9	1.80
2a	0.4	4.75	1.38	77.5	1.80
3	0.6	5.18	.65	88.8	2.2
3a	0.6	5.70	.70	89.1	2.2
4	0.8	6.43	.40	93.9	1.85
4a	0.8	6.43	.36	94.7	1.85
5	1.15	6.15	.50	92.5	3.5
5a	1.15	6.36	.35	94.8	3.5

It will be noticed that the consumption of cyanide is higher in the first series where equal proportions were used, but the extraction is also higher, and in practice the limiting factor would have to be carefully determined.

In the first series equal quantities of solution and sands were taken, and in the second series one-half the quantity of solution to that of ore. In both cases the time of treatment was four hours.

The next step was taken in regard to coarse concentrates which gave the following grading analysis

	Per cent
Remaining on a 30 mesh screen	2.
Passing a 30 mesh, but remaining on 60	31.
Passing a 60 mesh but remaining on 90	10.
Passing a 90 mesh	56.

Ore originally crushed through a screen having 600 holes per sq. in.

I would mention here that the figures of extraction are based on:

1. Original assay value of charge.
2. Assay value of solution, and
3. Assay value of residues.

A small experimental plant was designed and erected on the mine as shown in accompanying diagram, Fig. 1. It consists of a small centrifugal grinding machine discharging through a 100-mesh screen over an amalgamated copper plate, and from thence into a settling box. For the solution of the gold a revolving wooden barrel 4 ft. in diameter and 1 ft.

EXTRACTION TESTS ON VANNER SLIMES BY AGITATION IN CYANIDE SOLUTION.

	Date. 1902.	Charges Value.	Extraction.	Amount of Concentrates.	Amount of Solution.	Strength of Solution.		Consumption KCy.	Alkali Used.	Residues.	No. of Revolutions per Minute.	Strength Solution, Pb $(C_2H_3O_2)^2$.	Time, hours.	Assay Value Solution. Per Ton Solution	In Presence of
		Dwt.	P. c.	Gms.	Gms.	P. c.		Lb.		Dwt.				Dwt.	
A	Dec. 15	43.6	66	300	300	1		6	NaHO.	15.6	28	Nil.	10	28	Air.
B	Dec. 15	62.9	68.2	500	275	1		3.74	NaHO.	20	28	Nil.	10	78	Air.
C	Dec. 15	49.2	93.5	300	300	1		6.4	Lime.	3.2	28	Nil.	10	46	Air.
D	Dec. 15	65.65	83	500	275	1		4.4	Lime.	11.2	28	Nil.	10	99	Air.
E	Dec. 15	82.0	93	300	300	1		7.0	Lime.	5.0	28	0.6%	10	77	Air.
F	Dec. 17	101.78	97.7	500	250	1		3.4	Lime.	2.34	33	0.1%	5	198.88	Air.
G	Dec. 17	108.8	95.6	500	250	1		3.6	Lime.	4.8	33	0.5%	5	208.8	Air.
H	Dec. 17	107.4	95.53	500	250	1		3.6	Lime.	4.8	33	1.0%	5	205.2	Air.
I	Dec. 17	96.0	88.7	500	250	5		3.6	Lime.	10.8	33	1.0%	5	170.4	Air.
J	Dec. 17	101.8	92.34	400	200	5		3.6	Lime.	7.8	33	1.0%	5	188.0	Air.
K	Dec. 19	85	94.1	500	250	2		13.0	Lime.	5.0	33	Nil.	5	160.0	Air.
L	Dec. 19	76	94.7	500	250	2		13.0	Lime.	4.0	33	0%	5	144.0	Air.
M	Dec. 19	77.5	98.0	300	300	2		11.0	Lime.	1.5	33	Nil.	5	76.0	Air.
N	Dec. 19	78.4	84.7	300	300	2		12.0	Lime.	12.0	33	1%	5	66.4	Air.
O	Dec. 23	94.3	85.1	500	250	1	Less than	4	Lime.	14.0	33	Nil.	3½	80.3	Oxygen.
P	Dec. 23	79.6	95.0	500	250	1	"	4	Nil.	4.0	33	Nil.	3½	75.6	Oxygen.
Q	Dec. 23	86.0	90.0	500	250	1	"	4	Lime.	8.0	33	Nil.	3½	78.0	Air.
R	Dec. 23	99.1	93.6	500	250	1	"	4	Nil.	6.4	33	Nil.	3½	92.7	Air.
S	Dec. 23	92.9	37.8	500	250	1	"	4	Lime.	56	33	1%	3½	36.9	Air.
T	Dec. 23	94.0	36.2	500	250	1	"	4	Lime.	60	33	1%	3½	34.0	Air.

in length was provided, speeded up to run at 22 revolutions per min. and containing 4 baffle boards on the internal periphery. Fast and loose pulleys were attached. The charges were introduced into this barrel through a 4-inch pipe plug-hole on the outer circumference. Two other plug-holes were also arranged opposite to each other, and these were used for discharging by opening the two plugs and revolving the barrel. The sizes of the two plugs were 2 in. and ½ in. dia., respectively, the former discharging into a receptacle for the residues and the latter into an arrangement for catching the residue sample. A ¼-inch cock was also supplied for taking samples of solution throughout the treatment, and this was done by running the belt onto the loose pulley, and after allowing the charge to stand for a few seconds, the sample was drawn off and filtered. The whole time occupied in taking such a sample from the barrel was about 1 minute. The intention in making the diameter of the barrel so large in comparison with its length was to obtain as nearly as possible results which would correspond with those from a longer barrel of the same diameter to be used on a large scale. In the construction of the barrel every precaution was taken to leave a minimum amount of iron in contact with the solution.

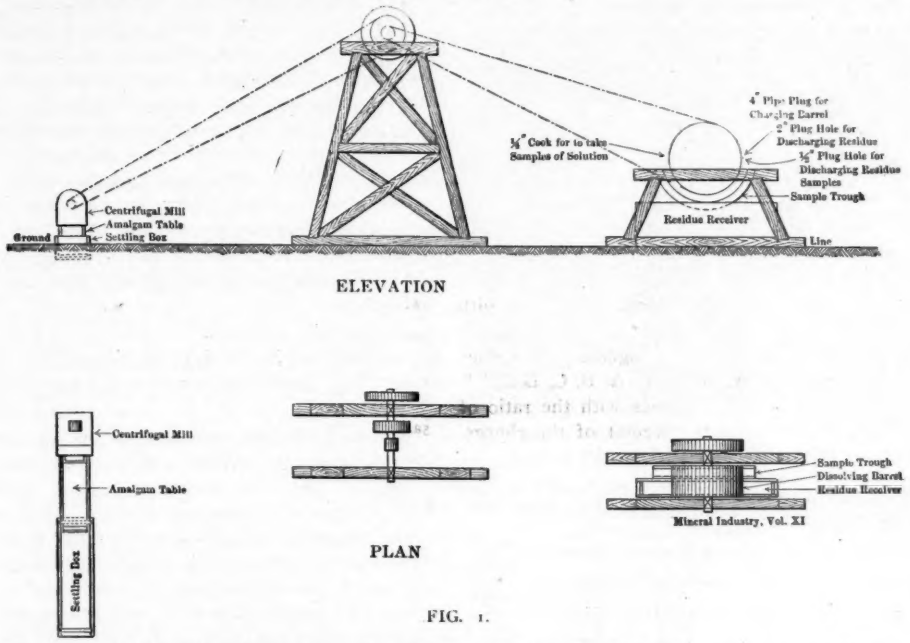


FIG. 1.

The result of the first test was as follows:

Assay value before grinding and amalgamating	100.00 dwt. per ton
Weight of charge	275 lb.
Assay value after amalgamation	73.50 dwt.
Extraction by amalgamation	26.5 per cent.
Approximate proportion of solution to ore.	2 : 3
Strength of cyanide solution	1.00 per cent.
Consumption of cyanide	4.26 lb. per ton.
Time of treatment	5 hours.
Extraction by cyanide treatment on 73.50 dwt.	93.06 per cent.
Extraction by amalgamation, plus cyanide treatment on 100 dwts.	94.9 per cent.
Residue value	5.1 dwt. per ton.

The residues from this experiment were given a second treatment of 3½ hours in a .18 per cent solution, the final residues showing an assay value of 4 dwt. per ton, representing a total extraction in the two treatments of 96 per cent, whilst the consumption of cyanide was equivalent to 4.95 lb. per ton treated.

Fully as high a percentage of amalgamation (26.5 per cent) might be expected in practice, and probably somewhat better if the whole of the concentrates were slimed.

Another test was conducted on practically the same lines as the first test, the main point of difference being that after the first five hours' treatment a weak sump solution was added without intermediate washing and agitated for nearly two hours. The following results were obtained from this test:

Value of concentrates	89 dwt. per ton.
Extraction by amalgamation	23.6 per cent.
Value after amalgamation	68 dwt. per ton.
Proportion of solution to concentrates	2:3 approx.
Strength of first solution	1 per cent.
Time agitated first solution	5 hours.
Consumption of cyanide	5 lb. per ton.
The residues assayed	4.2 dwt.
The extraction was	95.3 per cent.

Result of solution assays:

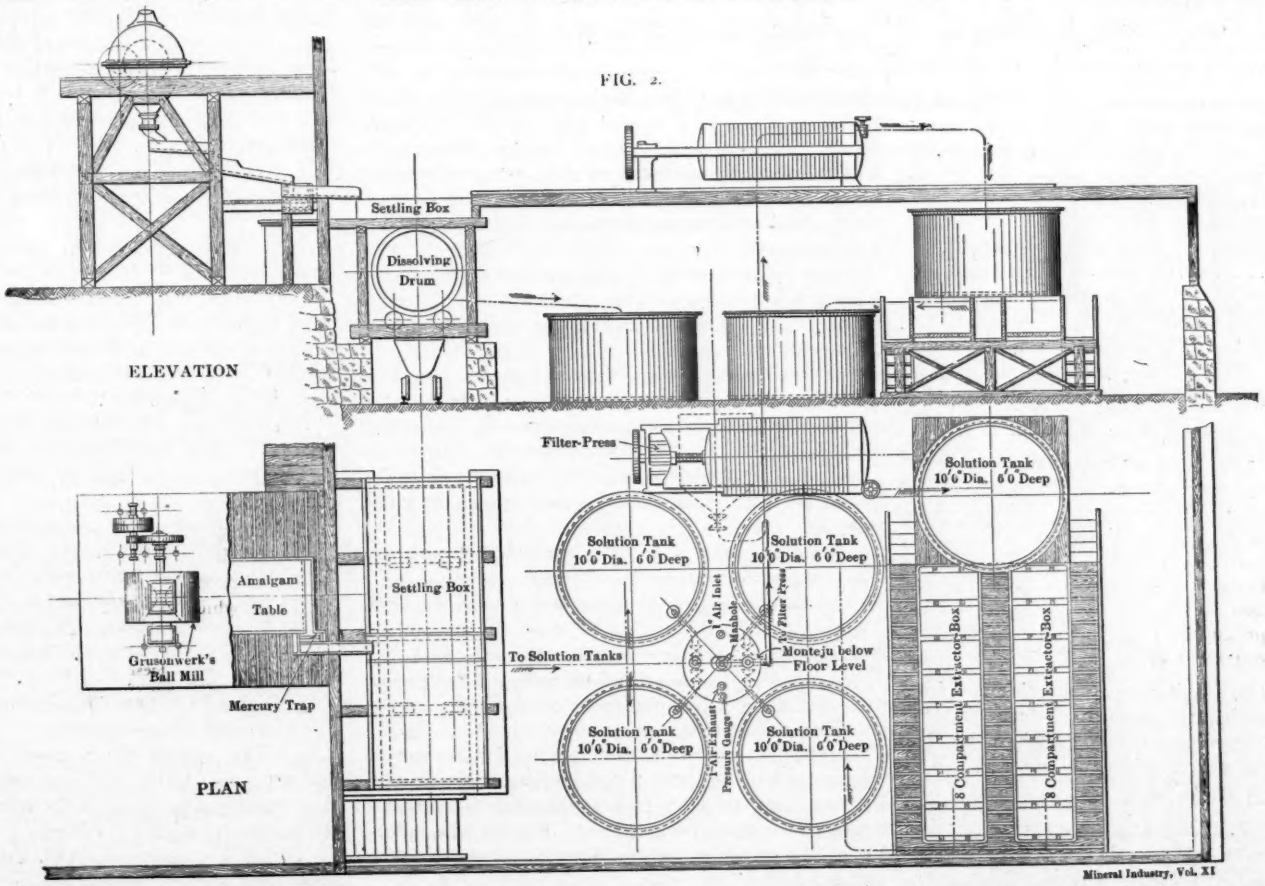
1—After	0.5	hours' treatment,	3.35	oz. per ton solution.	
2— "	1.0	"	4.35	"	
3— "	1.5	"	4.75	"	
4— "	2.0	"	4.65	"	
5— "	2.5	"	4.58	"	
6— "	3.0	"	4.50	"	
7— "	3.5	"	4.72	"	
8— "	4.0	"	4.59	"	
9— "	4.5	"	4.58	"	
10— "	5.0	"	4.48	"	

Diluted Solution (agitated for two hours more.)

11—After	5.2	hours' treatment,	3.08	oz per ton solution.	
12— "	5.5	"	3.17	"	
13— "	6.0	"	3.20	"	
14— "	6.5	"	3.26	"	
15— "	7.0	"	3.00	"	

In reviewing the results as obtained from this experiment it would appear that with the first solution the limit of extraction in the particular condi-

FIG. 2.



The assays of the solution taken during treatment were as follows:

1—After	0.5	hours' treatment,	3.475	oz. per ton solution.	
2— "	1.0	"	4.03	"	
3— "	1.5	"	4.04	"	
4— "	2.0	"	4.56	"	
5— "	2.5	"	5.12	"	
6— "	3.0	"	5.13	"	
7— "	3.5	"	5.13	"	
8— "	4.0	"	5.40	"	
9— "	4.5	"	5.44	"	
10— "	5.0	"	5.48	"	

tions obtaining was secured in 1½ hours, with a similar period for the second solution. One noticeable feature that was confirmed in all the experiments is that after the limit of extraction has been reached if the agitation is continued in a closed vessel without the introduction of further fresh air, precipitation of the gold in solution occurs gradually. By the addition of fresh solution and air, however, this difficulty may be overcome.

A further test was specially conducted to determine the advisability of using several solutions instead of only one, that is to say, that after a fresh solution had been introduced and agitated in contact with the charge for a period of one hour it was withdrawn. After making a number of these tests it was ascertained that one hour's treatment, using very finely ground material, with one solution proved efficient enough to fulfill all practical requirements. Various other tests were made, amongst which might be mentioned the following:

1. The addition of oxidizing agents.
2. A preliminary acid treatment.
3. Variations in strength of solution from very weak to comparatively strong,

and the final deduction drawn from the total sum of the whole experiments is to show that they favor fine grinding to at least 100 mesh on freshly made concentrates with a solution of cyanide from 0.5 to 1 per cent strong in the presence of fresh air and with the solution in the weight proportion of about 2 to 5 of ore. Further experience may, however, show that a higher proportion of solution to ore is preferable.

Following on the treatment of the coarser concentrates several tests were conducted on the treatment of the vanner slimes, two of which are given below:

Vanner Slimes.—The first of the tests on vanner slimes was interfered with considerably on account of trouble with the gear operating the barrel. The charge value was 104 dwt. per ton, and it was agitated for 2 hours and allowed to stand for 12 hours. The strength of the solution was 1 per cent and the consumption of cyanide 6.3 lb. per ton, whilst the proportion of solution to concentrates was 2:3. The ultimate extraction was equivalent to 94.7 per cent.

A subsequent test on similar material gave the following figures:

Value of charge	102.00 dwt.
Time of treatment	1 hour.
Assay value residues	5.6 dwt.
Extraction	94.5 per cent.

Vanner Slimes and Sands.—One test on vanner slimes and sands was made, but the mixed product did not give as good an extraction as was looked for.

The vanner slimes and sands were mixed in equal quantities and treated for 1.5 hours.

Assay value charge	48 dwt.
Assay value residues	5.1 dwt.
Extraction	89.4 per cent.

Two tests were conducted on solution alone, no ore being present to determine the consumption of cyanide due directly to the agitation of the solution in presence of air, according to the method and quantities used. In the first case a 0.27 per cent solution was used, being reduced in 0.5 hour to 0.26 per cent, in 1 hour to 0.255 per cent and in 1.5 hours to 0.25 per cent, when the consumption ceased. It was continued for a further 2.5 hours. This represented a consumption of 0.4 lb. per ton of solution.

The second test was conducted on a 0.95 per cent solution, and showed a consumption of exactly 1.0 lb. cyanide per ton solution in 0.5 hour, in the remaining 3.5 hour run no further consumption took place.

In view of the satisfactory results obtained from our experiments in the treatment of concentrates it was decided to erect immediately a plant at the New Goch mines, the details of which are reflected in the drawing, Fig. 2, attached.

The most important reason why peat gas can be more profitably and extensively employed than peat in large industrial works lies in the fact that by locating a large central power station at a suitable bog the cheapest kind of peat, namely, cut peat, satisfies all requirements; and the gas may then be piped for distribution, or, if the place of consumption be at too great a distance, it may be converted at the bog into electrical energy.

RELATIVE ADVANTAGE OF 2,300-VOLT ALTERNATING CURRENT VERSUS 550-VOLT DIRECT CURRENT, FOR MINE AND SMELTER WORK.

By HUGH A. BROWN.

In considering using alternating current the first decision required is which of the alternating currents now in use commercially will be best suited: Single-phase, two-phase, or three-phase. These involve the use of two wires, four wires and three wires respectively, as ordinarily installed. For the class of work under discussion, that showing the best economy is the three-phase system. A glance at Table I will show the relative economy in the motors, while in the transmission line the three-phase wire shows economy over the two-phase four wire.

The single-phase using the same number of wires as the direct current, which is two, while good for lighting loads, is at a disadvantage for motor work. This is due to motor inefficiency and inability to use the induction motor.

TABLE I.

Per cent of current required by alternating current motors, compared with direct current motors on equal voltage with unity power factors.

H. P.	Direct current, two wires.	Single-phase, two wires.	Two-phase, four wires.	Three-phase, three wires.
1	100	155.6	142.2	122.2
2	100	141.2	129.4	112.1
3	100	130.8	123.1	107.7
5	100	130	130	112.5
7½	100	123.3	126.7	110
10	100	123.7	115.8	98.7
15	100	....	117.8	101.8
20	100	....	117.3	102
30	100	....	118.6	102.2
40	100	....	117.9	101.3
50	100	....	110.9	96.2
200	100	....	110.9	95.6
75	100	....	111.6	96.7
100	100	....	110.3	96.2
150	100	....	110.9	95.9

The above table is compiled from data published in *Mining and Scientific Press*, of September, 1902. It is apparent that the figures given for three-phase motors are too low; for compared to direct current motor efficiency, it shows a higher than commercially possible efficiency for these motors. The figures will, however, be a general guide to this discussion.

The three-phase alternating current being chosen as the best representative of the alternating current types, let us compare it with the direct current. The 2,300-volt alternating current has the following advantages:

(1) (*a*) It can be cheaply transformed to higher or to lower voltages.

(*b*) This gives it the advantage of lower cost of line wire.

(*c*) For equal voltage the three-phase alternating current will require one-third more copper than the direct current, but comparing 2,300-volt alternating current against 550-volt direct current for long transmission the line required for direct current must, for same per cent of loss, contain twelve times as much copper.

(2) The motor used for constant speed work has no collector rings nor commutator.

(3) Motors above 50 h. p. can be used on 2,300 volts without transforming to lower voltage by use of suitable starting or switching devices.

(4) Low voltage arc and incandescent lamps can be used by addition of proper transformers.

It has these advantages:

(1) That it requires that current for all motors below 50 h. p. and for all lighting must pass through transformers which means a percentage loss which increases with decrease in load. Further, the inductance in the transformers tends to produce a low power factor.

(2) The transformer is an extra item of expense and always has a possibility of breakdown.

(3) (*a*) The presence of the power factor in alternating currents means that larger generators and motors must be used than for corresponding direct currents.

(*b*) More current is required to operate motors in proportion to lowness of power factor.

(*c*) This also adds to transformer and motor losses.

(4) The induction motors will be more costly, due largely to trade reasons.

(5) The lighting circuit will be three-wire system.

(6) If the load on motors varies so as to make a considerable per cent variation on the generator arc lamps will regulate badly and cause trouble, while incandescent lamps will simply flicker.

(7) (*a*) The very small clearance between rotor and stator, which is made necessary in order to have induction motors' theoretical efficiency equal to that of the direct current motor, is a mechanical objection equal in gravity to the use of sliding contacts or commutators.

(*b*) Figures from motors in use show these clearances to be

700 H. P.	0.054	in.
110 H. P.	0.045	"
25 H. P.	0.024	"
20 H. P.	0.023	"

(*c*) Well designed direct current apparatus has clearances usually ten times as great as these.

(8) (*a*) Induction motors will stall on slightly over 100 per cent overload.

(*b*) Induction motors when stalled are capable of remaining so for 30 seconds to one minute only without danger of burning out.

(9) (*a*) Speeds may be varied only by use of a special winding or slip rings.

(*b*) The efficiency of variable speed induction motors is low; and, further, the use of slip rings phases this motor in the class of sliding contact motors, giving it the disadvantage of both types of motors.

(*c*) A third special form of induction motor may be used for variable speed, without using slip rings. An auto-compensator is provided to control speed. This method makes an abnormal drain on the supply circuits, which causes lights to flicker and reduces power factor greatly. This motor is seldom recommended.

(10) (*a*) With a low power factor there is trouble and danger of overloading both generators and motors.

(*b*) This would also tend to make motors stall prematurely.

(*c*) On this account also, induction motors require more actual power to do same work as direct current motors.

(11) If it is desired to start induction motors under full load, costly devices are necessary.

(12) Alternating currents are more dangerous and fatal to life than direct current of same potential.

(13) High tension circuits (2,300 volts), are more dangerous to life and property than lower tension (550 volts) circuit.

Direct current 550 volts has these advantages:

(1) (*a*) Two wires only are used for both motor and lighting circuit against three wires on three-phase systems.

(*b*) No transformers are required.

(2) (*a*) Wiring is the simplest possible, circuit being branched out like a tree.

(*b*) Motors and lights can be put on same circuits although when steadiness of lighting is desired, separate circuits should be used. Subdivided circuits are preferable.

(3) The motors have higher commercial efficiency due to absence of power factor.

(4) The motors for a given horse power are smaller, owing to the principle upon which their design depends differing from the induction type by not stalling on temporary overloads.

(5) (*a*) Flexibility of speed, with good economy is possible with the standard motors of this type.

(*b*) Motors may be varied from 0 speed to 25 per cent above normal speed by any fineness of gradation desired with inexpensive rheostats.

(6) The direct current type of motor will carry several hundred per cent overload temporarily, and will blow a fuse or circuit breaker, or slip a belt before they will stop. This is quite a different characteristic from the induction motor.

(7) These motors require for starting a device the cost of which is within the neighborhood of 5 per cent of motor's cost; while for controlling speed an additional 2 per cent must be added to cost of starting device.

It has these advantages:

(1) Transformers for direct currents (called motor generators) are more expensive than the stationary alternating current transformers.

(2) (*a*) The voltages must be kept low, due to the revolving contacts.

(*b*) Therefore they are not used for very long distance of transmission.

(3) The fact that it requires revolving contacts or commutators on the motors.

(4) (*a*) The fact that these parts must be kept clean.

(*b*) While this may be classed as a disadvantage, it must be remembered that cleanliness of any machinery is usually a wholesome thing, and tends to lengthen its life.

(5) (*a*) The lighting must be done in series, or a motor generator must be employed on a three-wire system.

(*b*) Series lighting is used exclusively in street railway practice, but on buildings which are insured the rate will be higher with 500-volt series lighting than with some of the other systems.

There are, further, a large number of advantages of both types of motors over any other system of mechanical drive or other motive power. These points would form a separate discussion, and a profitable one to mine operators.

There are also a number of features of design common to both types of motors when made by equally reliable manufacturers, such as strength of insulation, and general electrical and mechanical design. These items are out of the scope of this present summation, but are points of importance, affecting the satisfactoriness of operation after the machinery is installed. Too much care cannot be exercised in scanning these details.

The relative advantages and disadvantages being placed in the mine or smelter operator's hands, the next part of the problem is cost of installation. For transmission of several miles the direct current system is at a disadvantage, and first course may show the 2,300-volt alternating current at an advantage.

The transmission, is, however, only a fractional part of the whole plant. No hard and fast rules can be laid down to determine which plant shall be direct current, and which alternating current. Each system has many mines to refer to where complete satisfaction and success mark its use. The determining of the most suitable current and voltage, therefore, rests with each separate mine operator, and depends upon his local conditions. The final decision can be made only when complete costs of the entire proposed installation are at hand.

An important use has been found for copperas as a water purifier. Experiments at Quincy, Ill., recently proved that 1½ grains of copperas and the same quantity of lime will purify by precipitation 1 gallon of turbid water pumped from the river. Copperas also has excellent antiseptic properties, especially for curing foot-and-mouth disease of cattle externally.

Explorations in China are proving the existence of large deposits of coal there, in addition to those already known. In the German protectorate district of Kiao-Chou, where mines were opened in 1902, the output to the end of December was 3,300 tons. This production is being increased, and consideration will be given to the establishment of a briquette factory. In the Fang Tsu district good discoveries have initiated the sinking of a second shaft. In the Poschan district prospecting is said to warrant the sinking of a shaft in the fall. To facilitate the development of these coal-fields a branch railway is being built to the Poschan valley from Changtien, about 28 miles westerly from Ching Chou.

A CARD SYSTEM FOR MINE SUPPLY ACCOUNTS.*

By F. W. Denton.

Since the first of the present year a card system has been in use at the Baltic copper mine in connection with the general supply account. The system has proved satisfactory. Two sets of cards are employed. One set is retained in the supply clerk's office and is kept up to date by him, and the other set is kept in the main office and is written up by the office clerks. The cards are 3 by 5 in. and 5 by 8 in. respectively, and are ruled as shown. The difference between the two sets is as follows: On the supply clerk's card, Fig. 1, only the date, balance on hand, quantity received and quantity used are recorded, while on the office card, Fig. 2, all of these appear, and in addition the initials of the firm supplying the goods, cost, value of amounts consumed and the accounts to which the supplies are charged.

The method of using the cards is as follows: When the duplicate bills for supplies are received one copy is sent to the supply clerk, who checks the bill and enters the quantities on his cards. As supplies are issued during the month a memorandum is made in an ordinary book in the usual manner. At the end of the month the supply clerk prepares from his memorandum book two reports, one of which is arranged according to the expense accounts and the other according to the kind of supplies. That is, on one report under each expense account will be put all of the supplies charged against that account for the month, and on the other report, under the name and size of each article, will be given the total consumption of that article. This last mentioned special report assists the office force in writing up the office cards. These reports are turned over to the general office.

At the end of each month, when all of the supply bills have been received and checked, the office clerks enter the quantities and costs on the proper cards and compute a new average price if necessary. This average price may be computed as closely as desired.

As soon as the pay-roll is finished at the first of the following month, before which time the supply clerk will have sent in his two reports, the office force takes the report of the supply clerk and completes the entries on the office cards. The special report of the supply clerk, showing the total amount issued of each kind of supplies, is used to check the work of picking out the individual records from the detailed report arranged by accounts, and insures all entries being made on each card at the same time. When the entries are finished on a card, and before returning the card to the drawer, the respective quantities used during the month are multiplied by the average price and the amounts entered in the proper column on the card, and also in the proper place in the supply clerk's report. The balances of quantity and value are then brought down on the card, and the work on that card is finished. By copying the total value of supplies consumed from the cards to the supply clerk's special report and afterward checking the footing of this report with that of the detailed report, a good check on all the clerical work but the multiplication is obtained, and the average price checks that near enough.

The values having been obtained in this way for the supply clerk's report, the main function of the card ceases as far as the mine books are concerned, and the supply clerk's report is then used in the usual manner. If any allowance is to be made for freight and other expense connected with supplies not covered by the original supply bills, such allowance can be made by adding a certain percentage to the footings on the supply clerk's report.

At the Baltic the supply account on the ledger will in future be charged with the amounts of the supply bills only, and credited with the amounts as figured from the cards.

The cost of handling supplies to and from warehouses, the cost of heating and lighting these buildings, and any other expense connected with the caring for supplies are all charged off each month as they occur to one of the general expense accounts under the name of caring for supplies. The freight bills paid each month for supplies are charged off the same month to the various expense accounts in proportion to the values of the supplies used by these accounts. This method of handling freight and other expense connected with supplies is as fair as any other in general use and has the following advantages: First, the balance shown by the supply account on the ledger should check with the balance shown by the cards; second, by keeping the expense of caring for supplies by itself this expense stands forth conspicuously each month and can be looked after the same as any other operating expense.

The time required to write up the cards is not as much as one might suppose. At the Baltic 48 air drills are in operation and about 750 men are employed. On June 1 there were in use 871 cards of each kind, and the value of the supplies on hand shown by the cards was about $28,000, which does not include fuel. The monthly consumption of supplies covered by the cards is about $8,500. With this amount of business our office force consists of a chief clerk, one assistant, one timekeeper and one supply clerk. It takes the clerk and his assistant about 1½ days to write up the cards after the supply clerk's reports are received. As previously stated, the data taken from bills are copied on the cards at the end of the month when the office work is lightest.

What are the advantages of the card system? Under our old method the supply account was charged with all expense connected with the supplies and then 10 per cent was added to a price list to insure a balance on the safe side of the account. The list of prices could not be kept correct, because prices change, and the average price of the stock on

ARTICLE **1½-In. Black Pipe.** 1903.

DATE	BAL.	REC'D	USED	DATE	BAL.	REC'D	USED	DATE	BAL.	REC'D	USED
	Ft.										
1–1	1066		655								
2–1	*411*										
2–9		509									
2-21		1045½	613½								
3–1	*1352*		830								
4–1	*522*		430								
5–1	*92*										
4-24		2090	220								
6–1	*1962*										

FIG. 1.

(Figures in italics represent red ink figures in the pen copy.)

*Paper read before the Lake Superior Mining Institute, August, 1903.

hand was not known; therefore, the prices were seldom right, and the 10 per cent addition to this approximate price only served to insure charging off enough.

When the time came for taking an inventory these prices would be put on the list turned in to the office, and if the total value was sufficient to balance the account, everything was considered satisfactory. Generally there was a surplus, but just where it came in was not known. If there was a deficit, another round of warehouses and surface would be made and each trip would result in finding something that had been omitted from the original inventory. These finds might balance the account. If they did not, then the deficit would be charged off and another year started without knowing just where the deficit occurred. Under the card system the balance that should be on hand is shown on the first

ARTICLE 1¼-in. Black Pipe. 1903.

DATE	BAL.	REC'D	FROM	COST	USED	VALUE	ACCT.	DATE	BAL.	REC'D	FROM	COST	USED	VALUE	ACCT.
	Ft.														
1—1	1956	@	32c	108 60	510	51	M. P.								
					60	6	C.&D.								
					25	3 50	H.								
					50	5 00	Const.								
					635	63 50									
2—1	411			41 10	505	47 98	M. E.								
2—9		509	I. E. S.	48 10	108	10 26	C.&D.								
2-21		1045½		98 79											
					618½	58 24									
3—1	1553	@	9.6c	139 75	570	54 72	M. E.								
					260	24 96	Cons.								
					830	79 68									
4—1	833	@	9.6c	80 07	92	8 83	M. E.								
					70	6 72	C.&D.								
					265	25 60	Con.								
					427	41 24									
5—1	82			8 62	60	4 80	H. R.								
4-24		2090	P. L. Rd	165 96	160	12 70	S. R.								
					220	17 60									
6—1	1962	@	8c	157 19											

(Figures in italics represent red ink figures in the pen copy.)

FIG. II.

of each month and this can readily be checked, in most cases by inspection, if desired. In any event, the cards check the consumption, because, when a requisition is put in for more of a given article, the cards should show the stock of that particular article to be used up or nearly so.

By entering the exact bill cost on the office cards and computing the average price each month if necessary, the supplies are charged off at exactly the proper price.

With certain supplies which are bought in bulk and issued in small quantities that are not accurately measured, such as waste, oil, etc., the quantity reported as consumed can be increased, and the price kept the same and chances of a deficit avoided. By charging only the bill cost to the supply account, the balance as shown by the cards should check with the balance shown by the account. When the inventory is taken it is only necessary to determine whether the balances called for by the cards are on hand. If there is any deficit or surplus it is known just where it occurs, and the trouble can be located at once and a remedy applied. By this method the exact cost per ton for supplies is known from month to month, and the average for the year should not be affected by any surplus or deficit.

In addition to these advantages there are other important ones, especially where the purchasing is done at the mines. It can readily be seen that from time to time as supplies are purchased it is easy to run over the cards and make up an order covering a sufficient quantity of supplies to offer an inducement to dealers to figure close. Then, too, by studying the consumption of supplies as shown by the cards, it is often possible to simplify the stock carried, getting rid of some sizes or adopting certain standards.

In conclusion, I wish to state that the successful introduction of this system at the Baltic mine has been due largely to the capacity and energy of the chief clerk, Mr. William C. Cole.

ORIGIN OF MINERAL VEIN FISSURES.

The following is taken from a book entitled 'Cornwall, Its Mines, Miners and Scenery," published in 1855. The explanations of ore deposition are interesting as indicating the shrewd though vague notions of an observant but anonymous writer of fifty years ago:

The fundamental facts for reasoning from are the prevalent parallelism of direction of the several systems of veins in a given district, which belong to successive periods of formation; the penetration by these fissures through a great variety of rocks; their length on the surface (some extending several miles); their depth, which in large veins exceeds the range of mining enterprise; the displacements of the rocks which they divide, and their various intersections and mutual relations.

A great point is to ascertain if the apparently peculiar phenomena of vein fissures can be referred to general laws, which extend beyond the mining districts. It is thought that such reference can be made to general laws in the similar parallelism of structural fissures, passing through various rocks for greater lengths than in mineral veins, and to unknown depths, with the same variety of mutual relation. Such are rock dikes and the symmetrical structures of rocks called joints and cleavage. The most prevalent direction of Cornish veins, east by north, is that of certain characteristic joints in a considerable portion of England. The lines also of the great cross-courses of the Penine Chain, Flintshire and Cornwall—north and northwest—are also coincident with a very general divisional structure of the rocks in most parts of Great Britain and several other parts of Europe. Mr. Henwood expressly states that the cross-courses and principal veins coincide more or less with the lines of symmetrical structures by which all the rocks of Cornwall are divided.

It is evident, however, from several circumstances, that it is not merely by the filling of joints of the rock that veins and dikes were produced, for the rocks have been disturbed in position and opened to a greater extent than the original divisional structures, or else these last are only to be regarded as minor effects of great disturbing causes which broke the strata along the line of fissures of veins and rock dikes. Some observations might be adduced to show that symmetrical divisional planes, such as joints and cleavage, are due to other causes than disruption of the strata. This whole branch, however, must be considered as still needing much patient study and inquiry, and the generalization of accumulated facts.

Filling of the Vein Fissures.—The Huttonian hypothesis of the earth's construction, opposed in almost every point to that of Werner, naturally conducted to a different interpretation of the same facts. According to the former, the fissures were preserved by forces depending on subterranean heat, and were filled by injection like rock dikes; and the parallel bands in the vein, which Werner ascribed to *successive aqueous deposition,* were referred by Hutton and Playfair to *successive igneous injection.* In support of this explanation, and as fatal to the Wernerian view, the Huttonians urged the acknowledged impossibility of solution in water of native, sulphur etted and oxidized metals, and many of the veinstones, and this was alleged to be favorable to the Huttonian view.

But the complicated phenomena exhibited by veins led some English writers, who admitted the posteriority of veins to the rocks which inclose them, to suppose their contents to have been collected from the neighboring strata by some peculiar process of segregation, depending upon electrical currents. It was supposed that the successive deposition and peculiar positions of the various substances which occur in veins might then be accounted for. This vague suggestion of electrical agency in depositing the materials of mineral veins has been reduced to a regular system by Mr. R. W. Fox, residing in Cornwall, who, by uniting the knowledge of veins to patient zeal in conducting experiments, has arrived at most valuable results. He has successively matured his views and advanced his experiments until they have attracted very general attention.

Mr. Fox assumes, as sufficiently proved, the origin of fissures from various causes and at various intervals and their enlargement from time to time; the progressive filling up of such fissures, and their penetration to great depths and regions of high temperature. He shows the probability of the circulation of heated water in them by ascent and descent, and the deposition of quartz and other earthy substances in cool parts, which had been dissolved by the water in hotter parts. In such fissures, filled with metallic and earthy solutions, the different sorts of matter on the sides must necessarily produce electrical action, which might be exalted by the peculiar distribution of temperature. The currents of electricity generated would pass more easily in the fissures than through the rocks, and in directions conformable to the general magnetical currents of the district. These would be east and west, or somewhat north or south of these points, according to the position of the magnetical poles at the period when the process was going on.

Electrical currents thus circumstanced would deposit the bases of the decomposed earthy and metallic salts on different parts of the rocky boundaries of the veins, according to the momentary electrical state and intensity of the points, on which conditions the *nature and position* of the rocks would be influential. When by such processes particular arrangements had taken place, new actions might arise and secondary phenomena, such as the transformation of ores *without change of form,* which are otherwise very difficult to understand. Lateral rents might also be filled by virtue of these new actions, even though they were not in the most favorable lines of electrical circulation.

This general hypothesis being admitted, it appears to follow that the observed influence of cross-courses on the quality and abundance of particular accumulations of ore in the veins which they divide affords strong ground to believe that in such cases the deposition of these ores was subsequent to the displacement of the vein fissure by the cross-course. Mr. Fox seems to think that the clays in the *flucans* and cross-courses were introduced mechanically, and not chemically, and that they affected in a peculiar manner the metallic distributions.

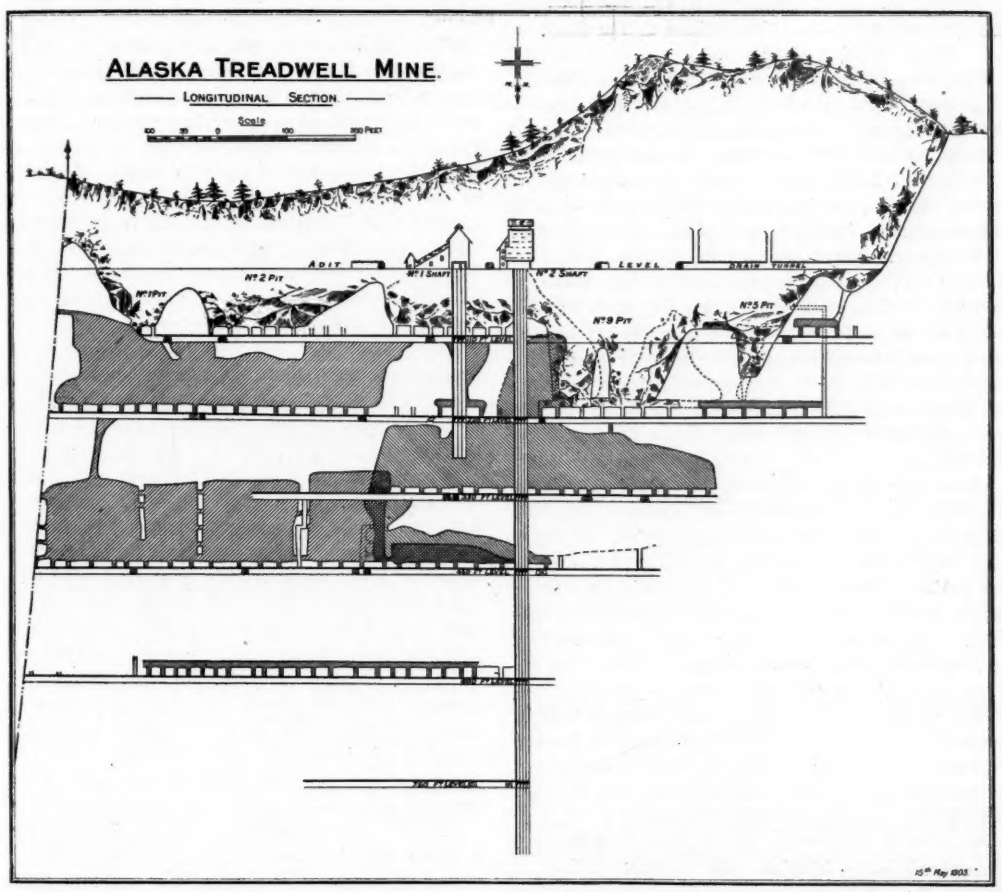
A striking argument in favor of Mr. Fox's electrical theory of mineral veins is, that he formed experimentally many well-defined metalliferous veins on a small scale by voltaic currents, operating under circumstances expressly arranged to imitate those which really occur in Cornwall.

ABSTRACTS OF OFFICIAL REPORTS.

Alaska Treadwell Gold Mining Company.

This company owns and operates a large property on Douglas Island, Alaska, which has been well known as an example of the successful operation of a very low-grade proposition. The report covers the year ending May 30, 1903. The capital stock amounts to $5,000,000, in shares of $25 par value.

During the year, the total development work amounted to 6,145 ft., including 2,158 ft. of drifts, 292 ft. cross-cuts, 1,979 ft. raises, 896 ft. intermediate drifts, 349 ft. stations, and 113 ft. shaft sinking. The principal incidents of this development were the connection of the 220-ft. level with No. 5 open pit; the continuation of the 330-ft. level, permitting the putting in of chutes and drawing off the ore by gravity. On the 440-ft. level a great deal of work has been done, and stoping is now being carried on, on an extensive scale. Much work was also done on the 600-ft. level, and a connection was made with the lower level of the 700-ft. mine of the Alaska United Mining Company. The average value of the ore taken from this level was last year greater than on any other part of the mine. On the 750-ft. level a station was finished, and an ore-pocket cut out with a capacity of 750 tons. Drifts are being run on this level, and a Riedler pump has been installed which, it is expected, will handle all the water from the 440-ft. level and below.



The following table shows the earnings and expenses for the year:

	Amount.	Per ton.
Bullion from mill	$785,515	$1.0386
Bullion from sulphurets	813,448	1.0755
Interest	1,498	0.0019
Commercial profits	65,241	0.0863
Total receipts	$1,665,702	$2.2023
Mining	682,374	0.9022
Milling	122,085	0.1614
Sulphuret expenses	112,504	0.1487
General expense, Douglas Island	5,117	0.0068
San Francisco office	7,170	0.0095
London office	1,281	0.0017
Paris office	223	0.0003
Consulting engineer	1,108	0.0015
Bullion charges	7,251	0.0096
New construction	34,380	0.0454
Total expenses	$973,493	$1.2871
Balance, net earnings	$692,209	$0.9152

To the net profit for the year, as shown above, is to be added $813,898 brought forward from 1902, and $43 from expense account; making a total of $1,506,150. From this total four dividends were paid amounting to $375,000 in all, and a balance of $448,493 was written off for depreciation of property and plant; making a total of $823,493, and leaving a balance forward to current year of $682,657.

The company owns two mills. In the old mill of 240 stamps, which is run part of the time by water and part of the time by steam power, operations were carried on for 356 days 3 hours during the year, steam being used for 215 days 13 hours and water for 141 days. The total ore crushed in this mill was 409,765 tons; an average of 4.80 tons per stamp per day. Steam was used for an unusual length of time in this mill, owing to a very dry season, making water for power scarce. The new mill of 300 stamps uses water power only, and ran 200 days 13 hours during the year. The total ore crushed was 346,560 tons, the average duty being 5.75 tons per stamp per day. Time was restricted for the same cause—the scarcity of water.

The following table shows some items of the cost and value of ore crushed in the two mills:

	240-mill.	300-mill.
Tons of ore crushed	409,765	346,560
Total assay value	$934,293	$763,214
Total tailings value	47,401	36,115
Net value	$886,892	$727,099

The total tonnage taken out was 759,625 tons. The total passed through the mill was, as above, 756,325 tons.

The estimate of ore reserves at the close of the year is as follows: Above 220-ft. level, 904,935 tons; above 330-ft. level, 507,397; above 440-ft. level, 642,206; above 600-ft. level, 960,000; above 750-ft. level, 576,000; broken ore in pits and stopes, 408,600; estimated tonnage on 750-ft. level, not yet developed, 288,000. Total 4,287,138 tons.

During the year there was an average of 33 machine drills at work in the mine, an average of 7 being employed on development, 4 on cutting out, 7.5 in pits, and 14.5 in underground stoping. The total number of feet of holes drilled in the mine was 783,360, and the number of tons of ore broken was 906,625, making an average of 1 1-7 tons ore broken for every foot of hole drilled. The average work on one machine per 10-hour shift was 34.4 ft. of holes.

The report is accompanied by a map showing the amount of work done in the mine up to date. This map is reproduced herewith.

During the year 3,700 samples were taken from the mine on different levels and assayed, the average value being $2.086 per ton. The total quantity of ore mined and sent to the two mills was 756,325 tons, the yield being shown in the table above. There were saved by concentration from the tailings 15,471 tons of sulphurets, which were sent to the Tacoma smelter for treatment, the result also being shown in the table above.

During the year the foundry produced 459,080 lb. of iron castings and 15,738 lb. brass castings. The machine shop has been fully employed, and in addition to repair work there were made 22 new mine cars, 8 mill cars, and 4 new skips for the mine. Additions to plant included an Ingersoll-Sergeant air-compressor, 20¼ by 24 cylinder, duplex. A new double cylinder engine was put in at No. 2 shaft, and a number of new tools bought for the shops, including two Ajax tool-sharpeners. A wing-dam 600 ft in length was put in to keep the tailings in place. The locomotives used in delivering ore to the stamp mills have been discarded, and a rope system adopted. The cars are now run down to the mills by gravity, while hoisting engines have been placed at the crushers to pull the empty cars back by means of a wire cable. This system has worked very satisfactorily.

Skilled labor was very scarce during the year, and the wages paid machine drillers in the open pit were increased to $3.50 per day, with board and lodging. Wages paid to machine drillers underground were $2.50, with board and lodging, the difference being due to the extra danger to those working in the open-cuts.

There were 20 accidents during the year; 11 of them were fatal, 6 caused serious and 3 slight injuries. Of these accidents, 10 were caused by falling of rock, 2 by train, 2 by falling down side of pit, 5 by an explosion and 1 being caught in machine.

The report of General Superintendent Joseph MacDonald gives a useful hint in the following: "During the year I have had a model of the mine made that has proved to be very useful. It is on the same scale as the mine maps, 30 ft. to an inch, and is made of pine blocks, each of which represents 100 ft. in width and the height between each different level. The stopes and drifts are carved out of the wood at the end of each month immediately after the surveyor has finished his monthly measurements. In this way the model is kept up to date and becomes a practical working instrument in the development of the mine. One of the most important results from its use has been the clear showing of just where pillars and ribs of quartz should be left to support the hanging-wall, and also where they could with safety be removed. The model also serves a good purpose in showing the foremen and shift bosses a practical illustration of the mine as it actually is, what is the condition of the stopes, and the relative position of the workings on one level with those of another. To attain this the shift-bosses come to the office one or two evenings each month, and examine the different stopes and drifts as shown. The same system of co-ordinate lines that are on the mine plans are reproduced and lettered on the model. Any particular point on the map can be instantly found on the model, or *vice versa*."

Rochester & Pittsburg Coal & Iron Company.

This company owns and operates coal lands in Western Pennsylvania. It is controlled by the Buffalo, Rochester & Pittsburg Railroad Company. The report for the year ending June 30, 1903, gives the following particulars of operations:

"The surplus of the Rochester & Pittsburg Coal & Iron Company for the fiscal year amounted to $1,561,086, out of which dividend No. 8 of 15 per cent was declared, and the amount, $600,000, credited to profit and loss account. The above surplus was arrived at after taking from the net earnings $114,000, principal of bonds paid off, and $294,552, expended for mining machinery, buildings, equipment, development of mines and sundry miscellaneous items. The company derived considerable profit during a part of the year from the high price prevailing

for coke. The strike in the anthracite region also enabled it to sell at advanced prices coal which was not under contract.

"The Consolidated Coal and Iron Company and the Indiana County Coal Company having been organized to acquire extensive coal lands and coal rights on the line of Indiana Branch, the Rochester & Pittsburg Coal & Iron Company purchased the securities of both companies. The amount disbursed to June 30, 1903, for this purpose was $696,495. With the view of further developing the industries on the line of your road, the company undertook the construction of the Adrian Furnace, at Falls Creek, Pa. It is nearing completion, and when in operation will be capable of making about 250 tons of pig iron per day. At the close of the fiscal year $476,424 had been paid on account of the cost of this furnace.

"To provide funds to pay for the securities of the two coal companies, the cost of the furnace, and for other corporate purposes, the Rochester & Pittsburg Coal & Iron Company created an issue of $2,000,000 in 4½ per cent sinking fund gold bonds, payable August 1, 1903, with option on the part of the company to retire the whole or any part before maturity at 105 per cent and interest; $1,000,000 of these bonds have been sold, the balance remaining in the treasury of the company.

"The sum of $25,000 has been set aside out of this year's earnings of the company as an accident insurance fund, for the benefit of the men injured in the employ of the company."

The coal traffic of the railroad was as follows:

	1902.	1903.	Changes.
Anthracite coal	56,315	55,102	D. 1,213
Bituminous coal	4,655,783	5,126,314	I. 470,531
Coke	615,270	795,307	I. 180,037
Totals	5,327,368	5,976,723	I. 649,355

In addition to the coal, the railroad carried last year 187,219 tons of iron ore and 197,987 tons of other mine products. The mineral freight formed about 80 per cent of the entire tonnage. The average haul last year was 145.6 miles; the average trainload, 441 tons. The average rate per ton-mile was 0.531c., and the cost 0.289c., leaving a profit of 0.242c.; an increase of 0.013c. over the previous year.

BOOKS REVIEWED.

United States Geological Survey. Elkland-Tioga Folio. Washington; Government Printing Office, 1903. Pages, 32; illustrated. Price, 25c.

This folio is No. 93 of the series being published by the United States Geological Survey. The area covered by the maps, the Elkland and Tioga quadrangles, is in Tioga and Potter counties, Pa., on the Pennsylvania-New York boundary, about midway from east to west, and adjoins that covered by the Gaines folio, No. 92. It is a region of gentle folds and plateau-like topography, being, in fact, part of the great Allegheny plateau, the southwest corner of the Elkland quadrangle being about 40 miles northwest of the western margin of the Appalachian valley. The general relief is that of a dissected plateau, the elevations of the crest-lines of the mountain belts varying from 2,000 to 2,300 ft. above sea-level. The rock formation includes the loose, unconsolidated deposits of glacial origin and the sedimentary rocks of Devonian and Carboniferous age, the total thickness of the latter being about 3,500 ft. These ancient sediments the geologists divide into five formations; Chemung, Cattaraugus, Oswayo, Mauch Chunk and Pottsville. The rocks are mostly sandstone and shale, the Cattaraugus and Oswayo formations including rocks classified in the reports of the Pennsylvania Survey as belonging to the Catskill and Pocono formations. These rocks are gently folded, the highest dips noted being 20°.

The text discusses the general characteristics of the various formations, their geologic origin, the cause of the uplift and folding, and the subsequent physiographic history of the area. The mineral resources of the area are few, embracing flagstone quarries, in the Chemung and Cattaraugus formations, and unimportant deposits of brick clay and hematite iron ore, though there is a possibility of oil wells of some importance being found. The mounting and typography of this folio fully equal the usual high standard of the Survey's publications.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Misrepresentation of Mines.

Sir.—I enclose herewith a circular letter, just placed in my hands, that purports to be distributed by the American Security & Trust Company, of New York and St. Louis, giving a description of their property and soliciting subscriptions to the stock of the Durango Mining Company.

They state that their property flanks two sides of the famous Mina Grande de la Paz, which is a property that I have had charge of for several years. Without commenting upon the false statements made regarding the Mina Grande, I wish you to call the attention of the investing public to the entirely false representations of the property of this Durango Mining Company. They represent the Mina Grande vein as being 8 ft. in width, as crossing their property and outcropping a long distance along the surface; that they have several veins of ore outcropping on the surface, one of which is 25 ft. in width; that there are several shafts down from 40 to 80 ft. in pay-ore; that there is on their property, on the Mina Grande vein, a shaft 80 ft. in depth that shows from 20 to 50 oz. in silver.

All of the above statements are absolutely false. The Mina Grande vein does not outcrop upon their properties. There are no known veins whatever upon their properties referred to, and a 25-ft. vein is pure fiction. There is not a single shaft upon these claims, or even a prospect hole that I am able to discover. The ignorance, to use a mild expression, of the promoters is best shown when they state that the Penoles and San Andres mines are near, implying additional value to the property of the Durango Mining Company by reason of the proximity to these famous producers. As the crow flies, the Penoles mines are not less than 70 kilometers to the north and the San Andres fully 130 kilometers to the west.

G. E. KEDZIE.

Rodeo, Durango, Mexico, Sept. 6, 1903.

The Right of a Man to His Name.

Sir.—The question has been raised whether a mining geologist or engineer, who has once reported upon a property in good faith, should allow his name, his social clubs, his official position, etc., to be used indiscriminately for ever after by the owners of the property, especially if, subsequently, he has found serious reasons for doubting their reliability and honesty.

So far as the writer is concerned, it is certainly held to the contrary. When a report is given upon a property for an investor and the latter afterward uses the engineer's name for the promotion of that property, the owner of the report certainly has no right to use the engineer's name in any manner which would be injurious to the latter's honor and reputation. For an engineer to be broadly published in newspaper advertisements, written to raise money from the unsuspicious and unwary, certainly places him in an unenviable and unprofessional light; and the writer personally knew an old expert of the gentlest character and the most honest motives who was absolutely ruined by allowing his name to be thus used.

Furthermore, it is unseemly for the promoter to advertise the personal attributes of his engineer—the name alone should stand for merit.

The writer knew a man who, in the employ of a government organization, was even over-conscientious in never giving a mining opinion, especially on property in the United States, and who was supersensitive in his antipathy to the use of titles, degrees, or official positions in connection with his name. Being in New Mexico, he received a letter from a prominent man asking him to drop over to old Mexico and look at his mine, which he did. Shortly after, he was horrified to see himself advertised in all the American papers as "Professor So-and-so," of the Blank Club and the U. S. Blank Survey. He promptly wrote to the promoter, saying that whatever reports he may have made on his enterprise were made as a private individual for a private individual, informing him, at the same time, that the United States Blank Survey had a singularly clean record in not having had its name mixed with the promotion of any mining schemes, and that he did not wish its record to be soiled through him or his friends. Furthermore, he informed him that the Blank Club was an association of gentlemen, and that membership therein carried with it no permit to use the club for advertising purposes. It is the writer's opinion that when a promoter abuses the use of an engineer's name, so as to injure him, that the latter has a perfect right to prohibit further use of his name at all. The report is only the written expression of an opinion derived from hard labor and travel in the field and intended solely for the information of the investor, and not for the purpose of catching feeble-minded investors who bite at gullible advertisements in the newspapers.

There are other occasions when it is the engineer's right, even though he may have made an investigation and received pay therefor, to prohibit the use of his name by the person for whom he has made the report.

Suppose that he should have made the investigation and report for persons whom he considered at the time to be of good character. Furthermore, suppose that the mine, after having been once promoted and the stock therein sold as high as three times above par without dividends, that the company should then be wrecked. Still suppose that it was impossible to ascertain the names of the president and directors of this company, and that the engineer believed that the promoters were not proper persons with whom to make investments; would it not be the duty of that engineer to forbid the use of his name in advertisements or for other purposes the aim of which was deception?

I know a promoter who, through his prominence in clubs and societies and by insidious social presumption, has time and again succeeded in floating companies, selling tremendous quantities of stock, and in not one of these instances has there been a dollar of return. I was once caught into making a report for such a man, not through a regular business arrangement, but simply because, as a fellow club member, he had requested me to drop over and see his property and write him what I thought about it. I received from him compensation about equivalent to my expenses and put much of my money into the mine, through misplaced confidence in him. Later, after acquiring a broader business acquaintance, I learned that not one of the many newspaper-advertised projects of this gentleman had ever earned a dollar for an investor. Having ascertained these facts, I maintain that I have a right to prohibit that man from using my name, even though he has the shadow of a claim by having paid me for my report.

OCCASIONAL CORRESPONDENT.

New York, Sept. 4, 1903.

If the charge of electricity usually associated with a single monad atom of matter were concentrated on a spherical nucleus one-hundred-thousandth of an atom's dimension in diameter, it would thereby possess a mass about one-thousandth of that of the lightest atom known, viz., the hydrogen atom. Such a hypothetical concentrated unit of electricity it has become customary to call an "electron."

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

RIGHTS IN PLACER LOCATIONS IN ACTUAL OCCUPATION, ETC.—A second locator cannot enter within the boundaries of a placer mining claim as staked by a prior locator and make a valid location of the ground on which the first locator is in actual possession and which he is engaged in working, on the ground that the first claim as staked exceeded the width prescribed by the local rules and regulations. Conceded (but not decided, the area of the claim being less than that permitted by the regulations) that as to the excess in width the original location was void, and, such excess subject to relocation, the owner was entitled to select the portion which he would hold and to draw in his lines, and he could not be ousted from the portion he was engaged in working in good faith by a second locator, the locator of a placer mining claim having sufficiently complied with the law as to such claims when he designated the boundaries by reference to the corner of a prior claim, having placed substantial stake monuments at each of the other corners, and in the center of each end line substantial stakes, so that the boundaries could be readily traced.—McIntosh v. Price (121 *Federal Reporter*, 716); United States Court of Appeals.

WHAT WILL NOT EXTEND RIGHT TO FILE LIEN FOR MATERIAL.—Parties contracted with a mining and milling company to furnish material for the construction of the latter's mill and delivered materials almost daily till in July, when the mill was completed, with the exception of some ore-bins, etc. The mill was put in operation at this time, all the mechanics engaged in its construction leaving, except one, who remained to make repairs, etc., and it was kept in operation until December, when it was closed down. During all this time parts were supplied and repairs made, and the contractors delivered more material in September and again in the following January. It was held that the materials delivered in January were not furnished pursuant to the original contract so as to entitle the contractors to a mechanic's lien for the balance due on all the material furnished by filing their claim within 60 days after the last delivery, and that they could not by such last delivery revive their right to a lien for materials furnished under the original contract, and thus defeat a lien already foreclosed by another material man.—Calhoun v. Fortune Mining & Milling Company (*72 Pacific Reporter*, 437); Supreme Court of Utah.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Wolfram, or Tungsten Ore.—Who purchases wolframite, and what grade must it be to be marketable? What is the approximate market value?—A. L. T.

Answer.—This is one of the higher-priced minerals and is valued for its content of tungstic acid. When high grade the ore carries from 65 to 75 per cent in tungstic acid, and is worth $2.50 to $3 per unit, while low grade ore assaying from 45 to 55 per cent brings about $2 per unit. Such ores must be free from sulphur and phosphorus, and are mined in this country principally in Arizona. The most important use for wolframite is in the preparation of the alloy ferro-tungsten.

Gypsum.—Where can I find a buyer for pure gypsum? I have large quantities near a railroad.—J. E. J.

Answer.—Gypsum is used chiefly calcined in the manufacture of plaster of paris, a substance employed for making molds, pressed and embossed ware of various kinds, for taking casts of statues, etc, and for producing a hard finish on walls. Cement and artificial marble are also made from burnt gypsum. In the crude state the rock is used sometimes as a fertilizer, or land-plaster. You do not state where your deposit is situated; Kansas is one of the largest producers. There is a combination in the central West, known as the United States Gypsum Company, with headquarters at 184 La Salle street, Chicago, Ill. In the East the greater part of the consumption is satisfied by imports from Canada, particularly from Nova Scotia. Dealers in New York are J. B. King & Co., 24 State street; Jed Frye & Co., 47 Water street, and Hammill & Gillespie, 240 Front street.

Fluorspar and Feldspar.—Having extensive deposits of these minerals in the South, and being assured of their purity, I am anxious to find consumers and incidentally wish to learn something as regards the market value. Can you help me?—P. T. C.

Answer.—As you suppose, fluorspar is the more valuable of the two minerals, and its production has increased materially in the past year, especially in Kentucky and other southern States. Fluorspar is used principally in the manufacture of hydrofluoric acid, in preparing glass, enamels, etc., and as a flux in steel-making. Its value at New York varies, according to quality, from $8 to $14.40 per short ton for lump, and $11.50 to $17.90 for ground. Dealers and consumers are John C. Wiarda & Co., Green and Provost streets, Brooklyn, N. Y.; L. Feuchtwanger & Co., 191 Fulton street, New York, and Fuerst Bros. & Co., 2 and 4 Stone street, New York. Feldspar is employed chiefly in the manufacture of porcelain and china, for which purpose it should be free from iron oxide, mica and quartz. As marketed, ground, it sells at New York at $8 per short ton, while the lump, for which there is little call, would not bring more than about half that price. Some consumers are Golding & Sons, Trenton, N. J.; Roessler & Hasslacher Chemical Co., 100 William street, New York, and Fuerst Bros. & Co., 2 and 4 Stone street, New York.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending September 15, 1903.

738,758. EXTRACTION OF PRECIOUS METALS FROM THEIR ORES.—Jose B. de Alzugaray, London, England, assignor to the Baxeres Gold Extraction Company, Limited, London, England. A process for extracting precious metals from their ores, which consists in agitating the crushed ore in a solvent solution, and blowing through the same a gaseous halogen compound and an acid compound diluted with oxygen in convenient form and constituting an oxidizing agent, and recovering the metals from the solvent in any well-known manner.

738,760. EARTH-BORING AUGER.—Abram M. Bevier, Superior, Wis. In an auger, the combination of a cylinder, open at one end and provided at such end with a boring-point forming a continuation thereof, and having a port formed in its opposite end, and an outwardly-opening valve adapted to govern said port.

738,815. PLANT FOR FEEDING MATERIAL TO BLAST-FURNACES.—Walter Kennedy, Allegheny, Pa. A plant for feeding materials to a blast-furnace, having in combination a tunnel provided with chutes or passages extending to the surface of the ground and having an opening in the bottom thereof for the passage of materials, gates for closing said chutes, a skipway extending from the top of the furnace to a point below the opening in the bottom of the tunnel, cars movable along the tunnel and skipway, and automatically-operating mechanism for shifting the cars along the tunnel.

738,843. COMBINED WELL-BORING AND ROCK-DRILLING MACHINE.—Seth H. Powers, Stanberry, Mo. A combined boring and drilling machine having a stationary annular master-gear, a revoluble platform carrying drilling mechanism and operatively connected with the master-gear, and an auger-holder carried by the platform and having detachable members mounted for relative longitudinal movement and having inner interlocking jaws.

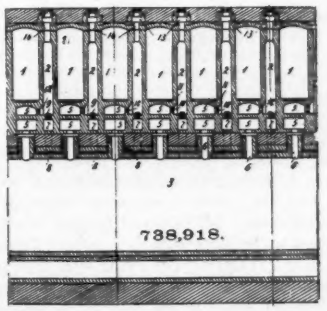
738,868. BLOWER.—Fergus F. Wilson, Brooklyn, N. Y., assignor to Albert J. Kelting, Brooklyn, N. Y. In a pressure-blower, the combination with the casing and rotary conical piston, of wings rotating with the piston and adapted to be oscillated about an axis transverse to the axis of rotation, bearing-blocks carried by the piston and movable longitudinally of the axis of rotation, said wings pivotally supported upon the bearing-blocks, and a spring compressed between the inner ends of said blocks and tending to force them outwardly.

738,880. CASTING-MACHINE.—Silas W. Bradley, Cornwall, Canada, assignor to the Canada Motor Bearing Company, Cornwall, Ontario, Canada. In a casting-machine the combination with the bed-plate, of a shell in which the lining is to be cast, and a core to form the inside of the lining, both located centrally on the bed-plate, a movable end piece for the mold having a rigid overlapping portion extending at right angles to the main portion and adapted to engage the shell and side pieces extending through guiding-slots in the bed-plate, means for drawing said end piece toward the bed-plate and a suitable cut-off for the upper end of the mold.

738,889. MILL FOR CRUSHING SAND.—Michael Drury, Houghton, Mich. In a mill of the class described, the combination of a revoluble vertically-disposed shaft, bearings therefor, a lower grinding element carried and revolved by the shaft, an upper grinding element guided but non-revoluble on the shaft, pivoted lever-arms connected to the upper grinding element, and cams, revolved by the shaft, coacting with said lever-arms to intermittently raise and drop the upper non-revoluble grinding element while the lower grinding element is revolving.

738,910. MACHINE FOR MAKING PRODUCTS OF CEMENT OR ARTIFICIAL STONE.—William E. Jaques, Grand Rapids, Mich., assignor to Alfred O. Crozier, Grand Rapids, Mich. In a machine for making products of the character indicated, a mold comprising a section which forms the surrounding walls of the chamber of the mold and having a bottom which is movable in a vertical plane and has such travel relative to the chamber-forming mold-section that the said bottom and the product formed within the said chamber and resting upon the said bottom shall be entirely removed from the said chamber, or the said chamber shall be closed by the said bottom from below, according as the said bottom is in the one or the other of its extreme positions during its travel in a vertical plane, which chamber-forming mold-section is provided, at the bottom, with a lateral slot; a plunger for effecting the actuation of and affording bearing to the said bottom; means for operating the plunger; means for feeding the mold-bottom through the aforesaid slot on to the plunger, and means for compacting the material fed to the chamber of the mold.

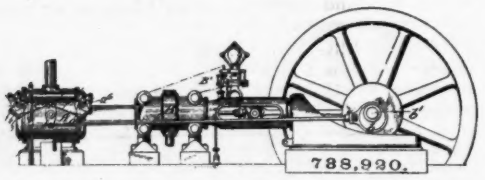
738,918. REGENERATIVE COKE-OVEN.—Heinrich Koppers, Carnap, near Essen, Germany. An improvement in regenerative coke-ovens comprising, in combination with the usual coking-chambers and the heating-flues, gas-regenerators and air-regenerators below said coking-chambers and heating-flues, gas-distributing channels below the bottom of the heating-flues, air-distributing channels below the ovens and with which the air-regenerators communicate, covering-arches above the heating-flues, vertical borings in the bottom of the heating-flues placed perpendicularly below the



openings in the covering-arches of the heating-flues, said vertical borings communicating with the gas-distributing channels, removable nozzles in said borings, recesses in the side walls of the heating-flues close to the bottom of the same, horizontal borings in the side walls of the air-channels connecting the same with the recesses in the side walls of the heating-flues, nozzles in said horizontal borings, openings in the top wall of the oven above the gas-channels at the upper end of the heating-flues, and removable cover-plates closing said openings in the top wall of the oven.

738,920. AIR-COMPRESSOR. George de Laval, Cambridge, and George P. Aborn, Boston, Mass., assignors to the Geo. F. Blake Manufacturing Company, New York, N. Y. In an air compressor having a cylinder, a piston, inlet-valves, the combination of a mechanism comprising a toggle for operating said valves, and a device open to the excess pressure in the receiver or reservoir for breaking the

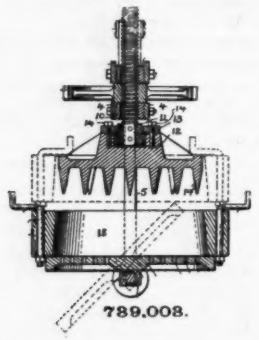
said toggle whereby the closing of said valves is retarded and a lesser amount of air than usual compressed.



738,966. MANUFACTURE OF COAL-TAR COMPOSITION AND PITCHES.—Frederick J. Warren, Newton, Mass. A method for decreasing the variation in viscosity of coal-tar cements and pitches consisting in treating the coal-tars with impalpable carbon in predetermined quantity.

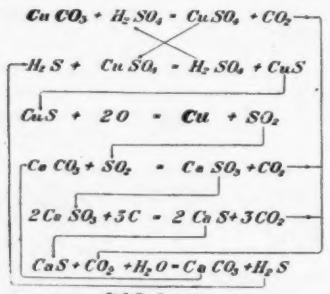
738,991. GEARING FOR ROLLING-MILLS. Joseph Fawell, Pittsburg, Pa. A rolling mill having in combination a vertical roll, a driving-shaft, intermeshing miter-wheels on said roll and shaft, an alining block engaging the roll and provided with an open-topped saddle engaging the miter-wheel on the shaft.

739,003. PRESS FOR SQUEEZING MUSHY, ZINKY, OR COPPERY LEAD DROSSES.—William H. Howard, Pueblo, Colo. In a press, the combination with a support, of a fixed upright screw secured therein, a plunger loosely swiveled on the lower end of said screw, a plurality of teeth projecting from the under side of said plunger and adapted



to indent the material being treated, a frame supporting said material, and a nut meshing with said screw for feeding said frame up toward and down away from said plunger without relative turning thereof, whereby after said material has been withdrawn from said plunger the latter can be freely turned to cause said teeth to make a new series of holes in said material.

739,011. PROCESS OF TREATING ORES. Frederick Laist, Salt Lake City, Utah, assignor of two-thirds to Hudson Smith and Peter C. Brown, Salt Lake City. A method of generating hydrogen sulphide and precipitating copper, which consists in subjecting an alkaline-earth sulphide suspended in water to the action of carbon dioxide, thereby



739,011.

generating hydrogen sulphide and precipitating the carbonate of the alkaline-earth metal, conducting said hydrogen sulphide into the presence of copper in solution, thereby precipitating copper sulphide and forming a solvent liquid, and treating copper ores with said solvent liquid.

739,033. SHIP LOADING OR COALING DEVICE. Julius Tarr, Philadelphia, Pa. In a device of the character described, a boom pivoted to the deck of the vessel, guy-ropes for adjusting and securing the boom in place, a cable secured at one end to another vessel or to the land, this end being secured at a point lower than the upper end of the boom, said cable passing over a roller journaled in the upper end of the boom and also over a roller secured to the mast of the vessel, a weight suspended upon this end of the cable, a traveler designed to travel along said cable, a cable secured to said traveler, a bucket or other receptacle suspended from said cable, said cable passing from the traveler over a pulley upon the boom downward to a winding apparatus, means for releasing the bucket so as to allow the same to descend when it has reached its destination.

739,042. SAND PUMP OR BAILER.—Morris C. White, Los Angeles, Cal. A sand pump and bailer comprising a tubular body furnished near its bottom with a piston-seat and open axially to and through its bottom; a piston constructed and arranged to play below the piston-seat and comprising a ring to fit against the piston-seat and a valve constructed to close the opening through the ring and to open upwardly through the piston-seat to allow the material in the well to pass freely into the body of the bailer; the usual lateral outlet being provided in the bailer below the piston-seat, and below which outlet the piston may play to discharge the contents of the bailer.

739,062. CASTING MACHINE.—Fred. N. Cline, Chicago, Ill. In a metal-casting machine, in combination with the master-wheels and endless chain encompassing them, and a plurality of molds secured to the links of the chain respectively; mechanism independent of the chain for actuating both master-wheels to give them interrupted or step-by-step rotation; and metal crucibles overhanging the path of the molds, the actuating mechanism comprising automatic devices for disengaging the driving means timed to effect such disengagement at proper point to halt the molds successively at the discharge-spout of the crucible.

739,081. CONCENTRATING-MACHINE. Thomas H. Hicks, Fort Wayne, Ind., assignor to the Hicks Gold and Silver Extraction Company. In a concentrating-machine, a rotatable cylindrical vessel adapted to contain mercury, a discharge-opening for mercury escaping from said vessel, a mercury-coated lining covering the interior of said vessel and extending through the discharge-opening, and means for adjusting the area of the discharge-opening to prevent the discharge of water or ore while permitting the discharge of mercury.

739,104. PROCESS OF OBTAINING CARBON OF GREAT DECOLORIZING POWER.—Raphael Ostrejko, Satkuny, Russia. A process of producing carbon of great decolorizing power consisting in subjecting comminuted carboniferous substances, in a copiously-moistened condition and in small lots, to a rapid distillation without access of air, at a high temperature, concurrently exposing the carboniferous substances and the products of their distillation to superheated carbon dioxide.

739,108. PROCESS OF PURIFYING GASES CONTAINING SULPHUROUS ACID.—Hermann Rabe, St. Petersburg, Russia. A process of purifying gases containing sulphurous acid for Winkler's contact process to such degree that they satisfy the test that in a dry condition after passing a glass disk during a long period they leave no traces thereon which process consists in passing the gases through a cooling-tower coming therein in direct contact with such an amount of sulphuric acid of any desired strength that the gases thereby are finally cooled to a temperature below 100 degrees C., and which process further consists in passing the gases through wide and thin layers of filtering material while removing periodically the slimy deposits from the filtering material.

739,116. PROCESS OF DISINTEGRATING ORES.—Charles T. Snedekor, Chicago, Ill. A process for disintegrating ores, which consists in first submerging the ore, while at normal temperature, in a solution containing an alkali, then heating said ore to a high degree of temperature, and then returning it while hot to said solution.

739,138. PROCESS OF TREATING TELLURIDE ORES OF GOLD AND SILVER.—Charles E. Baker and Arthur W. Burwell, Cleveland, Ohio. A process of treating ores of gold and silver containing a base metal and tellurium, which consists of combining the base metal and tellurium with chlorine, and separating the base-metal chloride from the other metals or metallic compounds in the mass.

739,130. ELECTROLYTIC PROCESS OF RECOVERING METALS FROM THEIR COMPOUNDS.—Charles E. Baker and Arthur W. Burwell, Cleveland, Ohio. An electrolytic process of recovering metals from their compounds, which consists of electrolyzing the metallic compound with a liquid cathode of a metal which is more volatile than the metal to be recovered, distilling the resulting amalgam or alloy, and condensing the vaporized cathode metal and continuously returning it as condensed to the cathode, as set forth.

739,140. APPARATUS FOR OXIDIZING METALS DISSOLVED IN MERCURY.—Charles E. Baker and Arthur W. Burwell, Cleveland, Ohio. An apparatus for oxidizing metals dissolved in amalgams, comprising a vessel containing the amalgam, an oxidizing-electrolyte in contact with the amalgam, and a piece of carbon in contact with both the amalgam and the electrolyte, said carbon having a secondary surface capable of coming into direct electrical connection with the amalgam.

739,174. MUFFLE-FURNACE.—Thomas Hardie, Philadelphia, Pa., assignor to Philadelphia Steel & Iron Company, Philadelphia, Pa. A muffle-furnace comprising fireplaces arranged at the sides of an externally-heated chamber, a longitudinally-subdivided floor-flue having a chimney-outlet, and crown-flues of which some extend from one fireplace across the top of the chamber and to one side of the floor-flue and of which others extend from the other fireplace across the top of the chamber to the other side of the floor-flue.

739,196. CEMENT-KILN.—Samuel R. Malone, Quanah, Tex., assignor of one-half to John E. Ledbetter, Quanah, Tex. The combination in a kiln of the character described, of twin ovens arranged side by side in horizontal plane, one oven being extended and provided with a feed-hopper as specified, tubular communication between the said ovens, at their far ends from the feed-hopper, an exit-spout at the exit end of the shorter oven, force feeding means in the said ovens, a thermometer in the tubular communication between the ovens and also in the exit-spout, and a furnace adapted to support and heat the ovens.

739,198. CHARGING APPARATUS.—Camille Mercader, Braddock, Pa. A charging-machine comprising a laterally movable carriage having vertically-movable supports arranged to receive a pile of plates, and mechanism for lowering the supports to deposit the pile upon the machine.

739,207. ROTARY PUMP.—Jens Nielsen, Cedar Falls, Iowa. In a machine of the class described, the casing having separate angularly-related wheel-chambers, and a transverse partition-wall between said chambers and provided with a single clearance-opening, and a rotating piston consisting of separate angularly-related wheel members of different diameters and having a loose cogged connection within the said single clearance-opening.

739,227. DISINTEGRATOR.—Joseph M. Schutz, Minneapolis, Minn., assignor to Schutz-O'Neill Company, Minneapolis, Minn. In a machine of the class described, the combination of the casing provided with an annular opening, with the face-plate arranged in said opening and provided with a shoulder of less diameter than said opening, a spout provided in said face-plate for the admission of air and the material to be ground, a grinding-ring situated in said shoulder and extending to the opposite wall of the casing; the portion of said ring within the shoulder being an internally-corrugated ring and the portion of the ring lying between the face-plate and said rear wall being composed of regularly-spaced fingers, the openings between which lead into said casing, said casing having a suitable opening for the discharge of air and ground material and a suitable beater revoluble within said grinding-ring.

739,231. GOLD-SEPARATOR.—William Snee, West Elizabeth, Pa., assignor of three-fourths to John A. Snee, Pittsburg, Pa. In a pneumatic separator, the combination of a casing having a closed hopper-shaped upper portion and a reduced lower body portion open at the bottom, a screen mounted in an opening in the side walls of said hopper-shaped portion, a feed-spout extending into the said upper portion of said casing to a point below the bottom of said screen, and a nozzle extending into said reduced portion and in alinement with said feed-spout to direct a blast of air against the powdered ore entering through said spout.

739,262. DEVICE FOR PUMPING OIL-WELLS.—Henry F. James and Edward R. Inman, Franklin, Pa.; said Inman assignor to said James. In a pumping-power of the class specified, a shaft, one worm rigidly mounted upon said shaft, bearings for said shaft, two worm-gears, one mounted upon each side of said shaft in a line perpendicular to the longitudinal axis of said worm, said gears adapted to be operated by said worm in opposite directions, a crank-pin in each of said gears, a base adapted to the mounting of said gears and said shaft.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending September 5, 1903.

17,228 of 1902. ROLLER MILL.—T. Parker and the Oliver Mill Co., London. A grinding mill consisting of a number of conical rollers arranged in tiers and mounted vertically in discs which rotate round a central axis.

17,709 of 1902. CYANIDE PROCESS IMPROVEMENTS.—J. B. de Alzugaray, London. In treating refractory gold ores by the cyanide process, introducing a gaseous mixture of a halogen compound, an acid and oxygen, in order to oxidize the pyrites.

22,699 and 24,091 of 1902. SLAG-BREAKER.—W. Lessing and A. Wolff, Elberfeld, Germany. A rotating horizontal drum with radial arms, to break up molten slag for making cement.

26,980 of 1902. CHROME STEEL.—C. W. Leitch, London, and Massenez, Weisbaden, Germany. A method of using pig iron containing as much as one per cent. of chromium for manufacturing steel, particularly means for keeping the slag molten.

27,360 of 1902. TREATING CYANIDE SLIMES.—H. L. Sulman and H. F. K. Picard, London. Passing cyanide slimes without filtering through sodium amalgam on which the gold in the solution is deposited.

28,605 of 1902. ALUMINUM SOLDER.—C. MacArthur, Aberdeen. A solder for aluminum made by melting one part of zinc, adding some sal ammoniac and carbonate of magnesia and then adding two parts of tin.

7,466 of 1903. COKE OVEN.—L. Z. Leiter, Washington, U. S. A. A coke oven process suitable for producing a pure coke from coal containing sulphur.

12,939 of 1903. SEPARATOR.—J. T. Burr, Glenville, Ohio, U. S. A. A machine for separating bodies of near specific gravities by means of their varying frictional resistance when sliding down slopes.

14,565 of 1903. CALCINING FURNACE.—M. P. Boss, San Francisco, U. S. A. A continuous metallurgical furnace for calcining reducing and refining, especially intended for producing steel from ores direct in one process.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep THE JOURNAL informed of their movements and appointments.

Mr. Axel O. Ihlseng is now in Mexico.

Mr. W. L. Austin is now at San Francisco.

Mr. Arthur W. Pearce is at Oruro, Bolivia.

Mr. A. C. Beatty was at St. Louis last week.

Mr. E. N. Van Cortlandt has returned to Denver.

Mr. G. C. Hazelet has returned to Valdez, Alaska.

Mr. George W. Tower, of Butte, is now in Alaska.

Mr. E. J. Seeley, of Denver, is visiting New York City.

Mr. Walter H. Weed is examining copper mines in Cuba.

Mr. John B. Farish was in New York on September 21.

Mr. George J. Bancroft, of Denver, is at Lead, S. Dak.

Mr. R. J. Frecheville has returned to London from Australia.

Mr. A. J. McMillan has left London for Rossland, B. C.

Mr. Orleans Longacre is examining mines at Red Mountain, Colo.

Mr. J. H. Cresswell is cyanide superintendent at Bodie, in California.

Mr. Joseph Luce, formerly of Salt Lake City, is now at San Diego, Cal.

Mr. V. G. Hills, of Cripple Creek, Colo., has returned from the Black hills.

Mr. Thos. Rickard, of London, has gone to Norway on professional business.

Mr. Richard A. Parker, of Boston, is in New York on professional business.

Mr. E. P. Arthur, Jr., of Cripple Creek, Colo., is in the South Pass district, Wyo.

Mr. J. W. Mercer has returned from Colorado. He goes to Ecuador early in October.

Mr. J. D. Audley Smith left New York September 22 on his return to Weiser, Idaho.

Mr. Woolsey McA. Johnson, of Iola, Kan., has been in New York during the week.

Mr. Fred P. Paul is at Heidelberg, where he is taking a special course in mineralogy.

Mr. Arthur L. Pearse, of London, has gone to Siberia, and will be absent several months.

Mr. Forbes Rickard, of Denver, has returned from Mexico and is now at Idaho City, Idaho.

Mr. William B. Dennis is manager of the Black Butte quicksilver mine, at Black Butte, Ore.

Mr. C. L. Dignowity, of Philadelphia, has returned from Boulder, Colo., and is now in New York.

Mr. Geo. K. Fischer, manager of the United States Smelting Company, has returned to Salt Lake City.

Mr. Charles A. Noack, of St. Louis, Mo., has been visiting the northwestern sections of Gilpin county, Colo.

Mr. W. B. Emmett, of New York, recently inspected property on the iron ranges of western Ontario.

Mr. H. C. Hoover is on his way to Australia to examine the London and Globe Deep Leads, in Victoria.

Mr. E. C. Engelhardt has returned to Denver after an absence of seven months in Arizona and California.

Mr. R. Gilman Brown, of San Francisco, is now at Bodie, Cal., and expects to be at Salt Lake City shortly.

Mr. Fred H. Morley has joined Mr. George J. Bancroft in professional work, with headquarters at Denver.

Mr. Chester W. Purington, who has been making examinations in Clear Creek county, has returned to Denver.

Mr. W. E. Defty, of Phoenix, Ariz., is now in Mexico, where he will remain until the first week in October.

Mr. George E. Collins is busy in Arizona and Nevada. He will return to Denver about the end of September.

Mr. P. G. Lidner returned from London on September 17 by steamer *Saxonia*. He expects to go to Mexico shortly.

Mr. Louis A. Wright has returned to El Paso, Tex., after 10 weeks absence on professional business in Parral, Sonora, Mex.

Mr. C. Brockhold has succeeded Mr. F. Sustersic as general manager of the San Andreas de la Sierra mine in Durango, Mex.

Mr. H. H. Armstead, Jr., of New York, has returned from Denver. He expects to make Denver his headquarters in future.

Judge George W. Bartch, president of the Sheba Company, has returned from a month's trip to the mine and San Francisco.

Mr. G. W. Smith, of Florence, Colo., has returned from Mexico, where he went in the interest of the Ojo Calientes Mining Company.

Mr. J. E. McAllister, smelter superintendent of the British Columbia Copper Company, in the Boundary district, B. C., is visiting New York.

Mr. Truman H. Aldrich, of Birmingham, Ala., visited Salt Lake recently for the purpose of studying the methods of gold extraction.

Mr. T. P. Rigney has accepted the general superintendency of the Summit Placer Mining Company's properties and mill at Soldier Summit, Utah.

Mr. E. Gybbon Spilsbury and Rear-Admiral Geo. W. Melville left New York for Mexico this week. Mr. Spilsbury expects to be absent three weeks.

Prof. Regis Chauvenet, of Denver, is not dangerously ill, as was reported in the daily press. On the contrary, he is well and busy at work, we are glad to state.

Mr. A. R. Milner, of the Utah Copper Company, is at Bingham, Utah, from Canyon City, Colo., to superintend construction of the concentrator for the company.

Mr. J. William Green has resigned as mine manage for the Jefferson Coal Mining Company, of Springfield, Ill. He expects to locate in the Indian Territory coal-fields.

Mr. Robert D. Anderson, of the Dominion Coal Company, at Glace Bay, N. S., has accepted the position of assistant superintendent of the Warren Bituminous Company.

Mr. Wm. Weston has left Denver to report on the Routt county, Colo., anthracite and bituminous coal-fields. He will make his headquarters at Yampa and Steamboat Springs.

Mr. A. S. Bigelow, superintendent of the Pelger and Capsilver mines of the Franco-Russian Company, des Aimaks in Mongolia, has returned to North Columbia, Nevada county, Cal.

Mr. P. T. Carey, of the Mexican Gold and Silver Recovery Company, about 30 miles from San Marcos, Tepic, Mex., has accepted a position with the Esperanza Company at El Oro.

Mr. L. S. Austin has accepted the appointment of Professor of Metallurgy at the Michigan College of Mines and leaves New York next week to take up residence at Houghton, Mich.

Mr. George G. Blackwell, of George G. Blackwell Sons and Company, Limited, sailed from Liverpool on the *Lucania* on September 19. He will visit steel and iron centers in this country.

Mr. J. H. Hobbs, president, and Mr. J. J. Key, secretary, of La Luz Mining Company, of Colorado Springs, Colo., were inspecting the company's property at Guanajuato, Mex., recently.

Mr. Jackling, manager of the Utah Copper Company, at Bingham, Utah, has resigned, to take effect October 1, and will be succeeded by Mr. J. McDonald, superintendent of the Commercial mine, at Bingham.

Mr. R. A. F. Penrose, Jr., has returned to Philadelphia after a trip to Alaska, which included a journey to Dawson, down the Yukon to Behring Sea, up to Cape Nome, and thence through the Aleutian Islands to Tacoma.

Mr. John Thomas, of Carbon, Ind., has been appointed mine inspector for the southern district of Indiana. Mr. Thomas is prominent in the United Mine Workers and has been a labor leader in his section for several years.

Mr. V. S. Hillyer, of Ishpeming, Mich., has been appointed third assistant examining and consulting engineer to Mr. E. N. Breitung and consulting engineer to the Breitung Hematite and Mary Charlotte mining companies at Negaunee, Mich.

Mr. Friedrich Correll, director of the Humboldt machinery manufacturing plant at Kalk, near Cologne, Germany, is at present visiting the western machinery houses, smelters and mining camps. He has been at Denver, Pueblo, Leadville and other Colorado points.

Mr. E. H. Platt has resigned the superintendency of the Commercial Lead Company of Flat River, Mo. to become assistant manager of the Denver Engineering Works Company. He is succeeded by Mr. Wm. Magenau, who has recently left an engagement in Mexico City, Mex.

OBITUARY.

A press despatch announces the death of Col. B. F. Morley, manager of the Mary Murphy mine at Romley, Colo., and of Adolph Alberson, superintendent of the mine, on September 21. They were killed by foul air while making an inspection of the mine workings. Col. Morley was well-known to mining men in Colorado. It was chiefly through his efforts that the Buena Vista smelter was erected.

SOCIETIES AND TECHNICAL SCHOOLS.

UNIVERSITY OF CALIFORNIA.—Mrs. Phoebe Hearst, who gave the University the mining building now being put up, has recently made a donation toward the improvement of the salaries in the department of mining.

PURDUE UNIVERSITY.—The Bureau of Forestry of the United States Department of Agriculture has established a timber testing station at this university, LaFayette, Ind. Other stations have been established at the University of California, at the Yale Forest School and at Washington, D. C. Various physica and mechanical tests will be made. This action of the bureau does not involve the erection of additional buildings at the university, but a more thorough utilization of equipment already existing in the laboratory for testing materials. Additional machines of a special character belonging to the bureau, will be installed The work will be under the direction of Dr. W. K. Hatt, who has charge of the work of all the timber testing stations of the Bureau of Forestry.

THOMAS S. CLARKSON MEMORIAL SCHOOL OF TECHNOLOGY.—The chair of Physics and Engineering at this school at Potsdam, N. Y., has been filled by the appointment of Byron Briggs Brackett, a graduate of Syracuse University, and John Hopkins' University. He is an associate member of the American Institute of Electrical Engineers and member of the American Association for the Advancement of Science. He has had teaching experience at Adelphi Academy, Brooklyn, N. Y.; electrical engineering laboratory of John Hopkins' University, Baltimore, Md.; at Union College, Schenectady, N. Y., and at Rutgers' College, New Brunswick, N. J. His practical electrical engineering experience comprises the inspection and testing of the cable manufactured for the United States army, during the Spanish-American war, by the General Electric Company, of Schenectady, N. Y.; a year's work with the late Prof. Henry A. Rowland, of John Hopkins' University, in the development of the Rowland printing telegraph, and considerable experience in commercial electrical testing at various times.

INDUSTRIAL.

The National Drill and Machine Company, of Barberton, O., is to erect a new building which will about double its capacity.

The Nassau Light and Power Company, at Roslyn, L. I., placed a contract for its buildings with the American Bridge Company.

The Mesta Machine Company has an order for two large blowing engines for the South Chicago plant of the Illinois Steel Company.

The American Steel and Wire Company is to build an addition at Joliet, Ill., the building to be 127 by 208 ft. Bids are now being asked.

The General Electric Company, of Schenectady, N. Y., through its New York office, has secured two orders for electrical equipment from Australia.

The Grothwell acid-proof compound made by A. Grothwell, of San Francisco, is being used in coating all the topworks of the Eureka quicksilver mine in California.

Sargent, Conant & Co., Equitable building, Boston, Mass., recently completed the installa-

tion of an electric lighting and power system for the town of Groton, Conn., and will shortly begin work on a similar equipment for the town of Millers Falls, Mass.

The H. K. Porter Company, of Pittsburg, Pa., builders of light locomotives, has bought 2½ acres of ground adjacent to its plant, which will be used in making extensive additions to the present works. The ground was bought from the American Bridge Company.

The Penn Gas Coal Company, of Pittsburg and Irwin, Pa., has decided to increase its capital stock from $1,500,000 to $2,000,000. The purpose of the increase is to provide for future extensions of the plant and operations, as the growth of business may make them necessary.

The Stromberg-Carlson Telephone Manufacturing Company, Rochester and Chicago, recently sold the Gladstone Refining Company, of Gladstone, Mich., an equipment of mine telephones. The company has also sold a similar equipment to the Tinton Telephone Company, Tinton, S. D.

The Lidgerwood Manufacturing Company, of New York, will defer building its proposed machine and erecting shops at Newark, N. J. The foundry and power house will be constructed at once, and bids are now being received. The power house will consist of a building 40 by 225 ft., and the foundry will be 120 by 600 ft.

The National Iron and Wire Company, of Cleveland, which recently completed a large factory building, has placed a contract for a brick and steel addition, two stories high and 80 by 300 ft. A power plant is being installed to operate all machinery by electric motors. The company will also install considerable new machinery in the new building.

The Western Electric Company, which will eventually expend from $5,000,000 to $7,000,000 in the construction of a plant at Hawthorne, Chicago, is making rapid progress, nine buildings being already under way, the contracts for which aggregate $1,207,247. A reservoir having a capacity of 5,000,000 gals. will be constructed for fire purposes and emergencies.

The Diamond Machine Company, of Providence, R. I., states that it has purchased the patents, patterns, and drawings of the Gorton disk grinders and will manufacture the full line, 23 machines, at its works in Providence. The shops of the Gorton Machine Company will probably be employed upon the construction of mining machines embodying important improvements.

The Buffalo Forge Company recently shipped to the Omaha and Council Bluffs Street Railway Company two 320-in. full housing steel plate fans, having discharge orifices 5 ft. 6 in. by 9 ft. 8 in., with blast wheels 18 ft. in diameter, each driven by a 14-in. by 14-in. Buffalo horizontal center crank, class A. engine, and will be used in connection with Green fuel economizers.

The Westinghouse Electric and Machine Company is about to put in the equipment of the new Pennsylvania American Plate Glass Works, at Alexandria, Ind. The plant cost $340,000, of which $90,000 is for buildings and $250,000 for machinery. The generators will furnish 3,600 h.p. driven by three gas engines. Twenty-one grinders will be driven direct by motors at each grinder.

At the annual meeting of the stockholders of the National Steel and Wire Company, at Portland, Me., recently all the nine directors were re-elected except Frank L. Brown, the new member of the board being M. L. Requa, of San Francisco. The board organized by the election of E. B. Webster, of Boston, president; E. F. Shellaberger, of De Kalb, Ill., vice-president; H. Sanborn Smith, of New Haven, Conn., secretary, and E. R. Hastings, of Boston, treasurer.

The Susquehanna Iron Company, incorporated recently with a capital stock of $200,000, will operate the Danville blast furnaces, at Danville, Pa., and is in the market for considerable equipment, including mining machinery, hoists, air compressors, drills, cars, rails, electric-power plant equipment and gasoline engines, etc. The company's headquarters are at Catawassa, Pa. The buildings will be of steel throughout. H. R. von Dorster is in charge of the work.

The Niagara Falls Hydraulic Power and Manufacturing Company has begun transmission of power to the new industrial center on the northern outskirts of that city. To give service to this new section the company has erected a new transformer house and installed a new series of transformers of Westinghouse make. The generator that supplies the current is of Bullock make. It is a 1,000-kw. 11,000 volt machine, three phase, and is operated by one of the turbines in the power house at the water's edge.

The Lackawanna Iron and Steel Company has prepared its two furnaces, at North Cornwall, Pa., and Colebrook, Pa., for blowing in. The furnaces have been relined and increased in capacity. The two furnaces now in operation at Cornwall and Colebrook have ceased to use green ore and are using the supply of roasted ore on hand, and as a result there has been a partial suspension of work at the Cornwall ore mines. The Lebanon Valley furnace, in Lebanon, the small stack at North Lebanon and the Robesonia furnace are about the only stacks demanding crude Cornwall ore at present, less than half the normal demand.

The United Lead Company, successors to Markle Lead Works, St. Louis, Mo., has purchased a site at Granite City, Ill., comprising 30 acres of ground, upon which it will erect a large factory for the manufacture of various lead products. The plant will have a capacity of 150,000 tons per annum, manufacturing white lead by the Bailey, Carter and Old Dutch processes; red lead, litharge and by-products; lead pipe of all kinds; traps, bends and other plumbers' goods, and sheet lead. The company already has at Granite City a factory for the manufacture of shot and sealing wax. The new works will be equipped with electrically driven machinery. Barton Sewell is president of the company, E. R. Hoyt vice-president, F. W. Hills secretary and Thomas J. Phillips treasurer.

TRADE CATALOGUES.

A. Wyckoff & Son Company, of Elmira, N. Y., continue to send out printed matter, calling attention to the merits of Wyckoff's wooden steam pipe covering, and Wyckoff's wood water pipe.

The Northern Electrical Manufacturing Company, of Madison, Wis., in bulletin No. 32, a pamphlet of 16 pages describes in detail the construction of its electrical motors for use on traveling cranes.

Geo. G. Blackwell Sons & Company, Limited, with main offices at the Albany, Liverpool, Eng., issue an illustrated folder, calling attention to fluorspar mines they control, and their facilities for furnishing fluorspar. The company states that it is at present supplying this material at the rate of 25,000 tons yearly.

A finely illustrated catalogue printed on heavy paper is issued by the Hayward Company, of New York City. In its 144 pages are described the company's orange peel and clam shell buckets; also the company's dredges, traveling derricks, skid excavators, stiff-leg derricks, revolving derricks, placer mining excavators, and traveling cranes in operation, and is a most artistic piece of work.

The Blaisdell Machinery Company, of Bradford, Pa., issues some advance pages from its 1904 catalogue, calling attention to its air and gas compressors. The company makes steam-driven single and duplex two-stage compressors, also belt-driven compressors, single, and duplex two-stage, and states that it is prepared to build compressors to fulfill special requirements, and of any capacity up to 2,000 ft.

John A. Yeatman & Company, of San Francisco, Cal., are sending out printed matter calling attention to the Eclipse centrifugal pumps, particularly the step pressure pump for high heads or for supplying water to giants and its sand and gravel pump which is preferably mounted in dredge form. For elevating material about placer mines the company supplies the Adams' hydraulic lift. The company states that it makes a specialty of placer mine equipment and believes that its pumps offer new facilities for working placer gold fields.

The American Steel and Wire Company issues a 50-page pamphlet on water purification, calling attention to the use of sulphate of iron, one of the chemical products of the company, as an agent for purifying water. The treatment involves the addition of sulphate of iron to the water and its precipitation as ferric hydrate by the use of lime. The pamphlet gives the results of exhaustive tests made under the supervision of Ernest E. Irons, bacteriologist, and James E. Campbell, manufacturing chemist, at the Quincy, Ill., water works. The tests show the results obtained in reducing the turbidity and the bacterial content of the water.

The Harbison-Walker Company, of Pittsburg, Pa., issues a catalogue of its silica, magnesia, chrome and fireclay brick as a pamphlet of 116 pages bound in leather with a pocket flap. The company's works are in four departments, the Benezet department, with works at Pittsburg, and Homestead, Pa.; the Woodland department, with works in Clearfield, Cambria and Clinton counties, Pa.; the Star silica department, with works at Huntingdon county, Pa., and the chrome and magnesia department, with works at Homestead, the total yearly product of all the works being 180,000,000 bricks. The company's products are classified according to departments and include firebrick for blast furnaces, blast-furnace stoves, copper smelting furnaces, coke ovens, cement kilns, recuperator flues, glass furnaces, steel furnaces and locomotive firebox arches, the brick being moulded to the necessary shapes. The company manufactures also one brand of chrome brick for open-hearth steel furnaces, for soaking pits, etc., also two brands of magnesia brick for open-hearth basic steel furnaces and places where basic material is required. The pamphlet contains tables of dimensions of the various brick, temperatures of melting points of metals, etc., and illustrations of types of blast furnace stoves in general use.

The National Wood Pipe Company, of Los Angeles, Cal., successor to the California Red Wood Pipe Company, his issued its catalogue No. 2, entitled "The Whole Story of Wood Pipe." The pipe described includes the Wheeler continuous stave and the Woodward machine-banded wood water pipe. The company states that it uses Douglas fir for its northern and eastern trade, Pacific coast redwood for California and arid region trade, and Texas long leaf yellow pine, Georgia southern pine or cypress for its southern trade. The company's small pipe, from 3 to 18 in. in diameter, is made from 3 or more wooden staves, spirally banded with a heavy steel rod, thoroughly galvanized and passed through a bath of hot asphaltum. The pipe is banded for pressures of 20, 50, 100, 150, 200, 250 and 300 ft., the strength being never less than four times that necessary to retain the given pressure. The pipe is made in lengths of 10 to 20 ft., the ends being turned to a slight taper. Joints are connected by cast-iron collars, tapering from both ends to the center, but having ⅛ in. smaller diameter to allow for compression in driving. This pipe is recommended for irrigation purposes, city water works, etc. The Wheeler continuous stave pipe is made of staves which are put together as the pipe is laid and has no joints nor breaks. The pipe is stated to be especially adapted for irrigation work and for water power systems. The pamphlet contains tables giving friction losses, velocities at entrance and discharge and amount of discharge for pipe ranging from 3 to 120 in. in diameter.

SPECIAL CORRESPONDENCE.

Butte. Sept. 19.

(From Our Special Correspondent.)

The Washoe smelter is again turning out copper. The fires were started some days ago. Several hundred miners have been put to work at the mines of the Anaconda Copper Mining Company at Butte, and in the course of a week or 10 days probably these properties will be sending out as much ore as earlier in the year.

The Minnie Healey case is again before the court. Judge Harney has transferred the trial to the division presided over by Judge Clancy. Attorneys representing the Boston & Montana Company had asked Judge Harney for a change of venue, but against the protest Judge Harney sent it to another division of the same court. Judge Clancy has denied the plaintiffs a trial by jury. Miles Finlan is the nominal plaintiff, but the Boston & Montana Consolidated Copper and Silver Mining Company is the actual plaintiff, with F. Aug. Heinze, or the United Copper Company, the defendant. The present suit involves the title to the Minnie Healey mine, and was tried once before Judge Harney, the trial judge finding for Heinze. This is only one of several suits involving the same property.

A hose filled with powdered lime from which the lime was blown by use of compressed air into the faces of the opposing force of miners was the weapon used by one of the contending parties in a recent meeting underground in the Pennsylvania mine here.

Some time ago, I called your attention to the fact that both the Boston & Montana and the Montana Ore Purchasing Company were working what is known as No. 7 vein of the Pennsylvania mine, drifting towards each other, and that sooner or later something would happen when the two sides met. A few days ago the Boston & Montana miners were put to rout by the use of lime, by the Montana Ore Purchasing Company's forces.

Sam Ritchie, owner of the Nancy Hanks mine at Garnet, is defendant in a suit brought by the lessees of the Tiger, an adjoining property, who claim that Ritchie extracted ore from a lead, the apex of which is on the Tiger ground. The amount sued for is $20,000. An attempt was made to settle the dispute by arbitration, the matter being referred to Dr. Peter Musigbrod, the most extensive operator of the district. Dr. Musigbrod decided in favor of Ritchie, but the plaintiffs were not satisfied. The suit will be tried before Judge Napton at Phillipsburg.

There are no serious labor troubles at present in the state. The United Mine Workers of America who are getting a foothold here have presented a new wage scale for coal miners that so far the operators have not met, claiming that it is impossible to give the concessions asked. Snow to the depth of 2 ft. has fallen in the mountain districts, and will interfere with mining; it is about 30 days early. Rumor from a source supposed to be reliable, says that the Granite Bi-Metallic Company will, during the next twelve months gradually wind up its affairs. Perhaps one reason is the unfriendly attitude shown by county officials at Phillipsburg.

Denver. Sept. 19.

One-half of the Globe smelter, Denver, of the American Smelting and Refining Company, is now in operation, and the output is increasing daily. Another furnace was blown in on September 14. More than 100 of the old employes have returned to work, and 90 per cent of the remainder express willingness to return as soon as they feel safe from personal violence at the hands of agents of the Western Federation of Miners. Eighteen smelter men, who participated in the riots at the Globe smelter on July 3, were recently indicted by the grand jury. Twelve have been arrested and released on bonds awaiting trial, the other six having left the State. Notwithstanding the assurances given by the emissaries of the Western Federation of Miners that simultaneous strikes would occur at the other smelters of the company in the State, the company's smelters at Pueblo and Leadville continue in full operation, while the smelter at Durango is running with more than half its usual force.

The sympathetic miners' strike at Cripple Creek continues, several thousand men being still idle. The union men whose wages and hours were entirely satisfactory were not vouchsafed by the officials of the Western Federation the courtesy of a vote, but were ordered by the officials of the Western Federation of Miners to quit work on the plea of sympathy with mill men elsewhere. In southwestern Colorado, however, the officials of the Federation allowed the local miners' unions the privilege of a vote, and many of the idle Cripple Creek miners are naturally dissatisfied. There are nearly 1,000 militiamen quartered in the district. During the early part of the past week the military arrested and held in the guard house a number of agitators, charged with being implicated in various unpunished outrages. Legal procedings are pending to test the right of the military authorities to arrest and hold such men. On September 17 notices were posted at the mines and mills of the companies and individuals affiliated with the association that no member of any union affiliated or connected with the Western Federation of Miners will be given employment. No objection is made to the men belonging to local unions, provided the influence of the leaders of the Western Federation of Miners is eliminated. Under the protection afforded by the troops 700 men have returned to work in the mines and samplers. To these should be added the miners of the Portland, 468, many of whom are understood to be non-union, and the men employed on the Woods properties (which were not interfered with by the labor leaders), including lessees, with an approximate total of 200. There are a considerable number of lessees at work on other properties, and it is conservatively estimated there are not less than 1,500 and possibly 2,000 men already at work, as compared with 5,000 at the most liberal estimate when the strike was declared. A citizens' alliance has been formed by the business men and others of the town of Victor, similar to the one at the town of Cripple Creek.

C. G. Kennison, leader of the strikers' executive committee, was yesterday arrested at the Stratton's Independence while attempting to induce the engineers and pump men to quit work. When he was searched some incriminating papers were found. Kennison is known as a strike leader from the Coeur d'Alene. The militia have also arrested W. F. Davis, president of the Altman miners' union, and six other members of the union.

The Mine Owners' Association is importing miners from the copper and iron districts of Lake Superior and elsewhere. Nearly 100 arrived at Cripple Creek last evening, and upwards of 200 more are expected to-day.

At Ouray, on September 15, president Moyer, of the Western Federation of Miners, urged the miners to demand an 8-hour day for all mill men. The Ouray miners' union has 400 members, of whom 71 were present at the meeting. A committee was appointed to frame the demand and wait upon the mill operators. Whether the 329 members of the union not present at the meeting will conform to the 45 affirmative votes for trouble remains to be seen.

The lower valley country, from Montrose to Grand Junction, is flooded with striking miners from the Telluride district, who are applying to the ranchmen for work. The Telluride miners are reported increasingly dissatisfied, as they say they were assured by the representatives of the Western Federation of Miners that simultaneous strikes would occur at Ouray and Silverton.

At Silverton the mine operators have an agreement with the miners and mill men, covering wages and hours, to September 1, 1905. Inasmuch as the smelter men's union at Durango declared a strike at the Durango smelter on August 29, and Silverton is the chief source of ore supply for the smelter, the Western Federation is anxious to bring about a sympathetic miners' "strike" at Silverton. So far, however, the efforts of president Moyer and others have not been able to induce the miners and mill men to violate their agreement with the mine operators.

San Francisco. Sept. 16.

(From Our Special Correspondent.)

The executive committee of the State Anti-Debris Association has refused to accede to the request of the eastern men who have bought the Blue Point mine at Smartsville, Yuba county, and desired to remove by hydraulicking some 800,000 cu. yd. of earth covering the gravel. Some of the members of the committee saw the property, and had no personal objection to the plant, but as the association, though merely a private body, can make trouble, the mine will probably be allowed to remain idle. The mine is above the barriers being built by the Government and State on the Yuba river, and under the laws the company would have had to impound all the debris it created, so that no harm could have been done by the work. The Anti-Debris Association, however, can only see evil in hydraulic mining, no matter how carefully it is carried on.

The Stockton Chamber of Commerce is trying to induce the Fish Commission to enforce the use of impounding dams by the quartz and copper mines on the tributaries of the Tuolumne river, to prevent injury to fish. If any such action is taken quartz mining along part of the Mother lode, especially in Amador county, will receive a severe blow. The gold and silver mines of Amador and Calaveras counties are now yielding over $3,800,000 annually, not counting copper, and the coming year will see a combined yield of at least $4,000,000. There has never yet been any attempt to stop the quartz mines from dumping their quartz tailings in streams, as these tailings carry little or no clay, etc., and lodge in the little streams before reaching navigable waters. It is difficult to get valley fruit and farm men to realize the importance of the mining industries of the mountains, and their prejudice seems hard to overcome.

Both these cases should demand the attention of the California Miners' Association, and some action should be taken by that body, which was originally organized to defend the interests of the hydraulic miners, but has not been as active for two or three years as in times past. The association has a very large executive committee, and with a smaller executive committee of active mining men would probably have more influence.

An assistant United States district attorney has engaged Thos. Price, a chemist of this city, to prove that the fumes from the stacks of the furnaces of the smelters of the Mountain Copper Company at Keswick, in Shasta county, may be utilized for making sulphuric acid instead of doing injury to plant growth in that region. The suit (to be tried October 19) aims to perpetually enjoin the copper company from allowing its fumes to injure forest growth. It is a bald fact that there is little or no timber to be injured, as has been repeatedly reported by special agents, but the Government for some reason persists in harrassing the company. If the Mountain Copper Company has secured the copper claims on Elliott creek in Siskiyou county, as has been reported, it means much to that section. The claims are within a few miles of the Oregon State line over the mountain ridge, west of the Southern Pacific Railroad, and are more accessible from Oregon than from any point in California.

So far only 50 or 60 non-union miners have gone to work at the Yellow Aster mine at Randsburg, Kern county. The sheriff has closed all the saloons in the town as a precautionary measure. The company has issued notice that all former employes desiring to work must file their applications, and each case will be given individual consideration—that is to say the company will not deal with the union as a body.

In Tuolumne county the usual fall shortage of water has resulted in closing a number of mines, and some 600 or 700 men are laid off. Only those mines with auxiliary steam plants are able to go on.

The Western Union Oil Company, of Santa Maria, Santa Barbara county, which has acquired some 100,000 acres of oil land in that region is about to put in an 8 mile pipe line from the Purissima ranch to the railroad.

The sulphur works of the Stauffer Chemical Company in San Francisco, were destroyed by fire last week, causing a loss of some $35,000.

An official pamphlet has been issued assuring miners in Northern California that the establishment of forest reservations is not inimical to their interests, as the regulations will permit entry of mineral claims, also the cutting of timber for actual mining purposes. If the company needed a large amount of timber, it would have to buy from the Government.

Some of the provisional land reserves in the mountain regions of California will doubtless be abandoned on further investigations. Already the Government has suspended the forest reserve order issued about certain lands in the San Jacinto and San Bernardino forest reserves. Much of the land is not suited for growing timber and only good for mining and range purposes.

The larger oil companies are gradually absorbing the smaller ones either by direct purchase or by rents and royalty. One large company in southern California has now under its control, by paying rent or royalty, the properties of 45 smaller companies, which have practically retired from business as direct producers.

Butte and one or two other counties are devising means to collect and maintain a permanent mining exhibit which may be displayed at great exhibitions and then kept at the county seat at other times. Some people in Nevada county are talking of making a permanent mining exhibit at Chicago. There are plenty of specimens to be had, but cases for display must be provided and a man must be put in charge who has some understanding of the local conditions and be able to answer questions intelligently. That is about the only expense.

Victoria, B. C. Sept. 15.

(From Our Special Correspondent.)

An order in council has been passed by the Dominion government, for the admission temporarily of orange mineral dry, white and red lead, corroded out of lead produced in Canada, or from piglead produced from silver lead ore mined or smelted in Canada, on payment of a duty based on the cost of corroding the piglead, as may be determined by the minister of customs. Heretofore a duty of 5 per cent was charged on this material.

According to an official estimate, the value of the gold recovered in the Cariboo this year, approximately $300,000, falls considerably below the 1902 yield. The season has been generally unsatisfactory, due to unfavorable spring weather. The chief cause of the decreased output is the great falling off in the yield from the Cariboo Hydraulic, which under normal conditions should have produced as much as the total of all the other mines of the district, instead of too little to meet running expenses. It is understood, that general manager Hobson is to suggest a scheme for the extension of the water system, so that the company will be in future independent of weather conditions. In the Slough creek district, work is still proceeding at the Slough Creek, Limited, property, the main shaft being down 342 ft. Over 1,500 ft. of drifting has been done to date.

The announcement has been made that the War Eagle-Center Star companies, of Rossland, have completed arrangements for the erection of a concentrator with a capacity of 200 tons daily. The site is three-quarters of a mile from the Trail smelter on the C. & W. Railway, and the work will be commenced at once, under the direction of Frank Cazin, of Denver, Colo. The Elmore plant at the Le Roi No. 2 should be in operation in a week or ten days. Shipments from Rossland are at an annual rate of 400,000 tons.

Smelting rates at Rossland are now about as low as can be expected, and the Northport smelter has slightly raised its charges on low grade ferruginous ores, and has given shippers to understand that if they are dissatisfied they can send their ores elsewhere.

Two rich strikes have been reported at the Rambler-Cariboo and another at the American Boy in the Slocan. In the former case the ore body has widened to 20 in. at the 700 ft. level. On the American Boy, an 18 in. vein of solid galena has been encountered in an upraise between No. 4 and No. 5 tunnels. The excitement in the Poplar creek district continues. A piece of quartz was taken from one claim recently about the size of a man's hand, valued at $700.

The Kootenay mine, at Rossland, has closed down. The ore is said to be too low grade to stand present smelting charges. There is a possibility of the company establishing concentrating works on the property. The I. X. L. mine, a free milling property at Rossland, has been leased, the lessees shipping ore which has accumulated on the dump.

Last week, the Providence Company, operating near Greenwood, distributed a dividend of 52c. on the shares issued.

A resumption of operations in the Slocan is steadily taking place. The Ivanhoe, again working, has been extensively developed, but has not been productive. The Idaho has been re-opened, and a contract awarded for the installation of a new aerial tramway. From the Slocan City Mining Division an important strike of silver ore is reported in the No. 3 level of the Fisher Maiden.

Probably no section of British Columbia is attracting so much attention at the present time as the Lardeau. Another gold find is now reported at the north end of Trout lake. At Poplar creek much of the newly located ground is being developed. On the Lucky Jack two shifts of men are at work. At Fish creek the Ophir-Lode tram and stamp mill is completed. Operations at the Camborne group and the Gold Finch properties have been suspended, the Northwest Development Syndicate being in financial difficulties, the result of building mills and installing machinery before they had developed their ore.

A group of claims in the Lardeau, known as the Swede, near the Lucky Jack, was sold last week at a high figure. Another transaction was the consolidation of a dozen or more claims near Ferguson, Mountain Lion, Old Gold, and their acquisition by a Minneapolis

concern, known as the Kootenay Consolidated Mining Company.

The Crows Nest collieries in August again show an increase, the total being 73,600 tons, of which 19,000 tons represented the coke output. The local smelter demand for fuel is now being fully supplied.

A discovery of a large body of hematite is reported at Quatsino sound. This, if true, is the first discovery of hematite on Vancouver Island, and should have an important bearing on turning the magnetite deposits at Barclay sound to commercial account. The Tyee mine, at Mount Sicker made another record output in August of 4,787 tons, the value of the matte being $68,885.

The Kootenay lead mine operators, at a recent meeting, passed a resolution thanking the Dominion Government for the lead bounty. At the Payne, 75 men are now employed in the mine and mill. The Ivanhoe, it is reported, will shortly resume; the Last Chance is preparing to ship heavily; the Hartney group is to be reopened; the Rambler-Cariboo is working 75 men; the Ruth is employing 30 and a contract has been let for a 9,000 ft. tramway at the Idaho. Two strikes of ore are reported, one of them at the Wonderful, where a large body of concentrating ore has been exposed.

In East Kootenay it is proposed to build a tramway 3½ to 4 miles long at the Paradise mine, from which some very high grade ore was recently shipped. At Moyie the St. Eugene concentrator is being put in repair and machinery is being installed to save the zinc values.

In a week or so six furnaces should be in operation at the Granby works, in the Boundary district. A converter has been ordered for the British Columbia Copper Company's smelter. The smelters are now receiving all the coke required from Fernie; the only obstacle to greater activity is the scarcity of mine labor.

The International Coal and Coke Company's properties at Blairmore, from which it is expected a constant supply of fuel may be secured for the Granby works, were recently examined by a Pittsburg engineer, who reported that there are nine workable seams on the property, ranging from 6 to 18 ft. thick.

The ore struck in the east drift on the 400-ft. level at the Ymir mine is being shipped. The exact extent of the ore body is not yet known, but the ore is a rich galena and zinc blende and is reported to run over $100 per ton.

In the Nelson district the Star group, on Morning mountain, is bonded to Americans, who have paid a 10 per cent installment of $3,000 on the purchase price. It is stated that the new owners propose installing a stamp mill at once.

San Luis Potosi. Sept. 15.

(From Our Special Correspondent.)

In the Tlalpujahua and El Oro district of the states of Michoacan and Mexico, the latest company is the Los Ocotes Mining Company, with a capital of $360,000, Mexican. Charles M. Harrison is president. The company will begin work on its property at Tlalpujahua. A New York and English company is being organized by S. V. Davidor, of Milwaukee, Wis., to work La Paloma and other territory of the late J. M. Davidor. Diamond drill work has shown a rich and apparently new vein in the Pleyades of Wm. Brockman, of which N. F. Morton is manager. The new shaft of the Noche Buena is down 100 ft., a cross-cut has been started and the steam hoist is being erected. Machinery has been ordered for the Lill Mining Company and the Jupiter Mining Company, both of which are sinking in Tlalpujahua. At Zacualpan, in Mexico. work has started on the San Ignacio mines.

London. Sept. 12.

(From Our Special Correspondent.)

A cruel fate still exercises a baleful influence on the fortunes of the Elmore process for electrolytically producing copper tubes and sheets. It is about 12 years since the process fell into the hands of "Baron" Albert Grant, the Hooley or Whitaker Wright of days gone by. He floated several companies with large capital to work the process, but put all the money in his own pocket instead of building suitable works and providing for the purchase of unrefined copper. Under these circumstances the process stood no chance of success, and the companies drifted into bankruptcy. The French rights were bought by Mr. Secretan, the copper king, and under his direction the works erected near Paris, did excellently, and yielded handsome profits. Encouraged by the success of the French works, Mr. Stanley Elmore induced the Paris firm who financed the process in France to come to the rescue of the works at Leeds, Eng., and accordingly £200,000 was provided, and the English companies reconstructed. Just at this moment Mr. Secretan died. The control of the English and French companies then passed into the hands of the two sons-in-law of Mr. Secretan, and a precious mess they have made. The French company is slowly losing business, the profits have fallen away, and the quotation of the shares of the company have dropped alarmingly. The Leeds works are now in just as bad a state as they were before being reorganized by the French control. Instead of putting the old works in order and utilizing the plant already in place, it was decided to remove the works to another site and to provide an entirely new plant from France. This operation has now been laboriously completed after two years, but at the cost of the whole of the capital provided at the reorganization, and the company is now just as short of working capital as ever. There will be a serious explosion of wrath among shareholders when this state of things becomes known. In the past the Elmores have been blamed for the unfortunate condition of things by unthinking shareholders and by an undiscriminating public. There is no doubt they will come in for more abuse before long. It is with the object of placing the matter in its true light that I record it here. It is neither the Elmores in their professional or business capacity, or the process itself, that is to blame, but solely the impracticability of the present French control. How the process is to be extracted from its well-nigh hopeless position is not quite clear.

I have several times referred to the case of the Associated Northern Blocks, Limited, one of the West Australian companies that is going through its conversion from wildcat management to the respectability which now characterizes the leading mines there. The directors by means of one of the articles of association, which provides that any directors may be removed from office by the written requisition of all his confreres, suddenly ejected Mr. Landau, the chairman, and in order to calm their shareholders, placed the management in the hands of Bewick, Moreing & Co.. and coopted Sir Bartle Fere and Mr. J. H. Curle to seats on the board. Mr. Landau induced a section of the shareholders to call a meeting of the company, at which several resolutions hostile to the board were proposed. The meeting lasted for nearly four hours, and was a close imitation of Donnybrook fair. Stentorian oratory on the part of Mr. Landau, mutual shakings of fists across the table, and a chorus of shouts from the audience characterized the proceedings. The outcome was that a committee of inspection was appointed to investigate the charges and countercharges, and in the meantime no addition is made to the board. It is not at all certain how the board will be ultimately constituted, but it is probable that both Mr. Landau and his active opponents will have to retire and agree to the election of a more or less independent board who will act harmoniously with Bewick, Moreing & Co., as managers. This was the original proposition directly after Mr. Landau's removal, but it was considered best by shareholders, who had the counsels of Bewick, Moreing & Co., that the material already at hand in the way of a directorate should be used.

Your editorial article in the issue of August 22, where you mention the promoter's recommendation as a special advantage that the property is far away from the inquisitive shareholder is of particular interest in London. I pointed out two years or so ago, when the West African craze set in, that there is nothing a London promoter favors so much as inaccessibility. This was the particular charm of Coolgardie and Kalgoorlie in early days. It was an arid desert. Afterwards the Klondike was pounced on because it was in the Artic Circle and not a place where a shareholder would go for his health. When this district was played out for promoting purposes the west coast of Africa was the next choice. As a further variation in the climate, in this case, heat and dampness were the characteristics. Both in the Klondike and on the west coast, not only have miserably poor properties been introduced here as bonanzas, but imaginary properties have also been sold. In several cases options have been sold on properties in these districts, when the vendor had no option whatever. For this class of promotion, inaccessibility is not only desirable, but a prime necessity.

GENERAL MINING NEWS.

Chesapeake & Ohio Railway Company.—The official statement of coal and coke shipments in July, in short tons, is as follows:

	1902.	1903.
New River	19,190	242,936
Kanawha	18,394	145,934
Kentucky	7,986	13,133
	45,570	402,003
From connections	3,876	14,104
Total coal	49,446	416,107
New River	7,715	25,050
Kanawha	1,158	7,461
	8,873	32,511
From connections	307	51
Total coke	9,180	32,562
Grand total	58,626	448,669

The large shipments were to western points, although a substantial quantity of coal has also gone to tidewater, and to the East. The small shipments in July, 1902, were due to the miners' strike in the New River and Kanawha districts.

ALASKA.

DOUGLAS ISLAND.

F. W. Bradley says that manager Joseph MacDonald is crushing 4,500 tons a day from the three big Treadwell mines. The saving amounts to $2.25 in gold, of which $1 is free and $1.25 is in the concentrates. Total costs for surface mining and marketing amount to $1.20 a ton. In the Alaska-Mexican and the Alaska-United, where the mining is all underground, the costs run to $1.60.

ARIZONA.

COCHISE COUNTY.

Calumet & Arizona.—Four more converters have arrived at Douglas for the smelter.

Calumet & Bisbee.—Work is said to be encouraging. The shaft is down about 775 ft.

Copper Glance.—The partial flooding of this property has caused a suspension of sinking. The pumps have kept the shaft free, and it is probable that heavier pumps will be installed.

Houghton Development Company.—This company, it is reported, has purchased the Solomon Springs Copper Company's property for $500,000. The Houghton Company has for its directors Graham Pope, R. R. Goodell, J. H. Rice, F. G. Coggin and G. C. Lawton, of Houghton, Mich.; Samuel Kaufman, of Marquette, Mich., and George G. Barnum, of Duluth, Minn. The property is located 5 miles southeast of Bisbee, and consists of 16 claims on which some development work has been done. It is said the claims have good surface showing of iron and manganese that carry some copper.

GRAHAM COUNTY.

Standard.—At these copper mines at Clifton an aerial tramway, 3,200 ft. long, is reported building to connect with the railroad. It will operate by gravity.

MARICOPA COUNTY.

United Verde.—The smelter at this mine started recently after a three weeks' suspension, due to scarcity of coke.

MOHAVE COUNTY.

(From an Occasional Correspondent.)

Great Nest.—This mine, in Weaver district, in the range of mountains between the Colorado desert and the Colorado river, is receiving rock crushers and cyanide plant machinery. Development work is pushed.

King.—This mine at Mineral Park is reported showing high values in gold and native copper.

Manzanita.—This claim at Chloride, belonging to the Philadelphia & Arizona Mining Company, is being opened. The ores are principally gold and copper, and a shaft is down 70 ft.

Midnight.—The St. Charles Brothers & Babcock have suspended work on this mine, at New Niggerhead, until suitable reduction works for handling the low grade gold and silver ores is installed. The property has several hundred feet of underground workings, all of which is in large veins of ore.

Sorpresa Gold Mining Company.—The newspaper accounts of the rich gold strike near Kingman were greatly exaggerated. The Sorpresa Company has certainly made a rich find, but considerable development work must be done to prove the value of the property. The free gold is found in a fine grained hornblende granite.

Tennessee.—This mine, at Chloride, which has been closed since early in August, is about to resume operation. A new and additional supply of water for running the 100-ton concentratoor has been obtained.

Virginius.—This mine at Hasting's camp is reported having poor luck with its new amalgamator, and a number of experiments are being trieu. The mine has a large vein of calcite carrying gold.

PIMA COUNTY.

(From Our Special Correspondent.)

Century.—This mine, near Quijotoa, is having a smelter of small capacity installed which will also do some custom work.

PINAL COUNTY.

(From Our Special Correspondent.)

Christmas Gift.—This mine, 60 miles northwest of Tucson, has been taken over by the Plata Cobre Mining Company, of Denver, which will equip and operate it.

YAVAPAI COUNTY.

Leviathan.—The Trinity Mining Company is opening this old mine near Congress Junction. Altogether 1,000 ft. of development has been done.

Mount Union.—The Arizona-Michigan Mining Company is reported to have purchased this group. E. Greenwood is superintendent.

Nevada & Montauk.—This group of five claims is reported sold to the Pacific Gold Company, composed of Prescott and eastern men.

CALIFORNIA.

CALAVERAS COUNTY.

(*From Our Special Correspondent.*)

A vein of good ore has been found on the Italian ranch of the Lotro Brothers. The owners are doing their work, and having ore crushed at a custom mill.

South Bank.—On this claim, at Indian creek, W. H. Clary, Jr., will soon have new machinery, and will sink 100 ft., and then drift.

HUMBOLDT COUNTY.

Orleans Bar Gold Mining Company.—This company has bought from the Orleans Bar Mining Company, Ltd., the following claims in Orleans district: Patterson, Brown, Wayman, Chapman, Jones, Gurnee, Graham & Company, Bachelor, and the claims located by Joseph Good. Henry Wilder and P. W. Wasmuth, all placer properties.

KERN COUNTY.

Most of the dry-washing claims at Goler are now deserted.

Pearl Wedge.—Ore from this mine at Randsburg, has yielded returns of $91 per ton.

Yellow Aster.—This mine at Randsburg is working with a small force of non-union men. Some of the union miners have gone back to work, but not many. There has been no outbreak, and the miner's union men disclaim any intention of doing any harm to the company's property.

NEVADA COUNTY.

Central Shaft.—This shaft at Grass Valley is now the deepest in the county, being down about 1,700 ft., vertically. A long raise is being put up to connect with the North Star shaft. W. P. Martin, who has been foreman for many years, has resigned and is succeeded by Richard Barry, foreman of the Gold Hill mine. Barry is succeeded at the Gold Hill by John Angrove.

L. C. A.—This mine on Selby flat, owned by J. Lovelady, of Nevada City, has been bonded by Geo. Bonney, and a mill is to be erected later on.

New Orleans Mine Company.—This company, at Grass Valley, C. A. Brockington superintendent, has bored through to their rich property in the Houston hill. There is a 10-stamp mill on the property, and a large force of men will shortly be put on. It is also planned to erect a large mill. H. J. A. Brunner is superintendent.

New York Grass Valley Company.—A new Merrals mill has been put upon this mine at Grass Valley, G. W. Root superintendent. An improved roller rock breaker has also been installed.

Phelps Hill.—This mine, near Omega, has been sold to a Chicago company represented by C. A. Poage. The extent of the gravel deposits will now be thoroughly tested.

Shady Creek Placer.—A San Francisco company through F. A. Brophy has bought this property on the San Juan ridge. A 10-in. dredging pump is to be used on the claim, to handle 1,500 cubic yards of gravel in 24 hours.

PLACER COUNTY.

Crosby.—This mine, near Lincoln, has resumed operations. Drifts will be run from the 400-ft. level east and west to tap the ore bodies known to exist, and if found satisfactory a mill will be erected. The ore already taken out is expected to pay for the mill.

Shady Run.—W. G. Phipps has taken the management of this mine, near Dutch flat. Geo. Clader has charge of the 10-stamp mill.

PLUMAS COUNTY.

Johnny Bull.—A Kentucky syndicate bought these mines near Greenville, recently for $25,000.

SAN BERNARDINO COUNTY.

The ore find recently near Bagdad is said to show croppings running a long distance, but all the ground has been located.

At Sacramento Wash in Klinefelter canyon the Colorado Hydraulic Company reached bedrock at 29 ft., and has good paying gravel. A water plant will be installed, and oil fuel used for the boilers of the pumping plant.

SAN DIEGO COUNTY.

Oro Blanco Mining Company.—This company, at Banner, L. N. Bailey superintendent, is to start work on its tunnel to tap the Kentuck S. and Cincinnati Belle claims. C. E. Bailey, nephew of the president and superintendent, is to furnish most of the capital required for completing the tunnel.

Ready Relief.—This mine, at Banner, has been sold to a company mainly composed of Boston men. It has a 10-stamp water-power mill. This mine was discovered in 1872 by Louis Redman and the Bailey brothers, and the latter have worked it off and on ever since. It is in a position in the canyon admitting of easy working.

Stonewall.—This mine at Cuyamaca, eight miles from Julian, recently passed to new ownership, and a tramway has been built from the dump to the mill, so that the 15,000 tons there may be readily handled.

SAN LUIS OBISPO COUNTY.

Quien Sabe.—Work has been resumed on this quicksilver mine near Cambria.

Red Hill.—The tunnel being driven by C. L. Rigdon on this quicksilver mine at Cambria, has cut the vein, and more development work is to be done.

SHASTA COUNTY.

Bennington Group.—This group, near the Iron Mountain mine at Fielding, has been purchased by the Pittsburg and Mount Shasta Gold Mining and Milling Company, of Pittsburg, Pa. The officers are: B. N. Scott, president; John Parish, secretary, and J. F. McKee, J. D. St. Claire and J. Rubenstein, directors. The ore in the mines carries gold, silver and copper, and will be shipped to the Mountain Copper Company's smelters at Keswick for reduction. That company's ore railroad passes over the property. The claims purchased include the North Star, Alta, King, Warren, Concord, Bennington, Dorset, Yorktown and Prescott. The mines have not been worked, because capital was lacking.

Bulkhead.—In this old mine, at Lower springs, John Tiffin and John Boswell are taking out ore of very good quality. The body of sulphurets is extensive.

Mad Ox.—In this old mine at Whiskytown, near Redding, it is thought the old ore shoot has been found. Superintendent Joseph Bamber has found a ledge from which rich specimens are being taken. The mine is now known as the Grizzly Bear. A 10-stamp mill is to be put up soon.

Mount Shasta Gold Mines Corporation.—Two suits have been filed against this corporation in which, it is alleged, that the complainants were induced to sell their properties for stock on the representation that the company had acquired the Bully hill mines and smelters. The complaints state that the company has not bought the Bully hill mines, has not redeemed its stock at any price, and has mortgaged each property concerned.

SIERRA COUNTY.

Kenton.—This mine, near Allegheny, with its 10-stamp mill, has been shut down indefinitely.

Oriental Mining Company.—The tunnel is now in 2,900 ft. at this mine at Allegheny, Mason W. Mather, manager, and H. L. Johnson superintendent. They have been working on the tunnel since February, 1902, and do not expect to tap the ledge until 3,515 ft. in. The formation is very hard. Three shifts are working with two machine drills. A 50 h. p. air compressor, operated by water power is used. No timbering is required in the tunnel, which is ventilated by a fan and the four-gate system.

Sierra Buttes.—At this mine, 50 men are at work. Ore is being taken from No. 7 tunnel. No. 9 tunnel is in over 8,000 ft., and taps the vein at over 3,000 ft. depth. The ore at that point was of too low grade for profit.

SISKIYOU COUNTY.

Black Oak and Gold Nugget.—In these claims at Callahan, owned by Henry Murray and H. Coggins, a tunnel is being run. They have 200 tons of ore on the dump.

Blue Jeans.—The ledge has been struck in this claim, at China gulch, owned by Werst, Hadley & Phillips.

Golden Seal.—This group, near Oro Fino, owned by a Tacoma, Wash., company is reported sold to Cole Saunders, of Sacramento.

King Solomon.—This group of 24 claims, near Cecilville, is reported sold to eastern men for $75,000. Wayland H. Young is the new superintendent. The milling capacity of the reduction plant is to be enlarged.

TRINITY COUNTY.

Gold Dollar.—This group on Canyon creek above Junction City, has been placed under bond to Mark Manley. It is a gravel mine, containing 190 acres, and is owned by O'Neill, Davis, Tarpley and Leavitt. The mine has been worked with insufficient water, but if the tests are satisfactory Mr. Manley will provide a greater supply.

Layman.—The bond on this mine, owned by J. B. Layman has expired, and is not to be renewed.

Mountain Boomer.—This mine at Denny is owned by the Bobs Farm Mining Company, and has a new Huntington stamp mill on the ground. The new ditch and pipe line will soon be completed when the old 10-stamp mill and the new Huntington will be run by water power. A good body of ore is shown.

Sherwood.—This mine, at Denny, is under lease to J. Piersoll who has about 100 tons of ore on the dump.

TUOLUMNE COUNTY.

Willietta.—In this mine near Chinese Camp, Geo. Stayton superintendent, a strike of $100 rock has been made.

Sierra.—For this property at Groveland, John F. Giles, president and manager, a new pump has been shipped, and a supply of wood is being hauled in. The shaft has reached a depth of 225 ft., and drifting east and west from the 200 level has begun.

COLORADO.

BOULDER COUNTY.

Jay-I-See.—This mine was recently opened at Ironton under the management of John Kennedy for eastern men. Mr. Kennedy has placed orders for a compressor and other machinery. The mine paid in past years, but has been idle several years.

Trojan.—Work has been resumed at this mine near Boulder in the Sugar Loaf district. Two veins are being worked, one silver, the other gold. James Cohry, of Denver; James T. Phillips, of Eldora and Joe Myers, of Wall Street, own the mine.

CLEAR CREEK COUNTY.

Mason Consolidated Mining Company.—The name of this company is changed to the Forty States Mining Company. The property covers about 210 acres between Dumont and Freeland, and is controlled by Minneapolis and St. Paul men. It is opened for about 140 ft. by the Lucy tunnel. The Startle tunnel is now in 242 ft. The new officers are F. G. Walther, president; Dan F. Mason, vice-president; S. S. Crooks, secretary and treasurer. The capitalization has been increased to $1,500,000.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Boston & Denver Consolidated Mining and Milling Company.—Sinking is in progress at the Cook shaft with two shifts and nearly 200 ft. Sullivan air drills are used. The shaft will be continued to 1,400 ft., placing it below the workings of the Fisk or Gregory-Bobtail working. About 50 men are busy, including leasers. Regular shipments are made, mostly milling ores. Eastern men are interested and O. B. Thompson, Black Hawk, is manager. The outlook for the property is bright.

Colorado-Tellurium Gold Mining Company.—This company operating the Freedom mine under lease and bond has opened some very good ore in the old workings above the 500-ft. level, but up to date has opened no new ground. Regular shipments of milling ores are made, with some smelting ores at intervals. This week 54 tons of the regular milling ores gave 24 tons of concentrates, bringing $30 to the ton. Paterson, N. J., men are interested, and R. Borcherdt, Central City, is manager.

Elizabeth Gold Mining Company.—A steam plant has been installed on the Skelly mine in Illinois-Central district and sinking has begun. The shaft is down 100 ft. and will be sunk several hundred feet deeper. W. Ballantyne, Central City, is manager.

Golden Smelter.—This smelter at Golden is to start up in a few weeks, as soon as there is enough ore on hand. The Saratoga mine in the Russell district can not supply ore enough to keep the smelter running, as it requires about 200 tons per day. Reports are that the smelter has been run at a loss almost to date and the owners are now offering to treat ores, including transportation from Black Hawk, for $7.50 per ton, an increase of $1 per ton over their last rates. This is a flat rate with no penalty for silica, and a number of mines will send their low grade ores to the plant from now on. F. R. Carpenter, Golden, is manager.

Onoko Gold Mines Company.—A new 10 by 12 double friction hoist has been ordered for the Phillips mine in Leavenworth gulch and arrangements are being made to put up new shaft buildings. The company has shipped two small cars of smelting ores to Denver the past week, which gave net returns of $750, and has also shipped 70 tons of concentrating ores to the Idaho Springs concentrating mills, giving about 20 tons of first class looking concentrates. W. L. Shull, Russell gulch, is manager.

Quartz Hill Mining Company.—This company has recently been organized by Colorado Springs, Washington, D. C.; Chicago, Ill.; Dennison, Texas, and Newport, R. I., men to work the Golden Dollar

property in the Russell mining district. Men interested in the Lucani tunnel from Clear Creek are the chief factors in the company. New shaft buildings will be erected and machinery installed.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The average output the past week of all classes of ore was 2,250 tons a day. An increase is noted in zinc tonnage due to the improved market in the East.

A Y & Minnie.—In addition to its steady tonnage of 100 tons daily of low grade zinc sulphides to the Minnie mill shipments of 2,000 tons a month are made of a lead sulphide direct to the smelter.

Bon Air.—Two distinct ore shoots have been opened up at the 550-ft. level. They are being followed into new territory and occasional shipments of high grade carbonate ore are made.

Capitol Hill Mining Company.—This company has forfeited its lease on the Neusite placer and arrangements are pending for a new company to take over this large acreage of virgin ground in the northern part of the city.

Coronado.—The pumping plant is easily handling the water. Shipments are 150 tons good iron ore daily.

Eclipse.—Denver men are sinking a new deep shaft on the Breece hill gold-belt property. It is understood the D. H. Moffat people are back of the enterprise.

Golden Cycle Company.—This Denver combination in which eastern people are interested is putting down a new shaft on the Cycle claim in Buckeye gulch.

Iron Silver Mining Company.—Railroad spurs are being extended to the north Moyer workings of this company, which is making a heavy tonnage and has opened up the largest bodies of ore of any property in the Leadville district. When the new connections are made it will greatly increase its production.

Last Chance.—T. S. Schlessinger, operating this Horseshoe district property has opened a large body of siliceous ore that is handled by his new concentrating mill. The ore body has been opened 200 ft. and shows 37 ft. of mineral.

Mascot Mining and Milling Company.—This new company on the gold belt backed by Denver and eastern capital is sinking a shaft about 100 ft. north of the Ibex side lines on the Maud Hicks claim.

Midas.—The company has resumed development and is shipping 100 tons iron daily.

New Leadville Home Mining Company.—About 100 tons of good iron come daily from the Penrose ground. Work is being pushed in the second, third and fourth levels. Prospecting through the new upraise shows a new body of high grade material.

Peerless Maud.—In addition to a fine body of lead ore, which is shipped direct to the smelter, this company has opened a large concentrating siliceous ore that is milled successfully.

Pride of the West.—The new shaft is in contact but is being sunk another 50 ft. before drifting starts.

Ready Cash.—A new station has been cut at 45 ft. from the level of the tunnel which is in 480 ft. Prospecting is going on in the new upraise and 100 tons of rich ore are in the bins.

Small Hopes Consolidated Mining Company.—This company is shipping the dry sulphide dump to the smelter, getting small profits to the ton on its lead and silver contents. The R. A. M. is not shipping, although it has large bodies of low-grade ore exposed. Some good carbonate ore is coming from the several shafts operated by leasers.

South Winnie.—This is a part of the Fanny Rawlings territory leased to local people recently and after an idleness of some months operations are being resumed.

Starr.—At 500 ft. a good iron body has been disclosed from which daily shipments are made.

SAN MIGUEL COUNTY.

A press despatch states that the Ophir miners' union ordered a strike at the Butterfly-Terrible mine to enforce the Western Federation of Labor's demand for an 8-hour day in reduction works. The Butterfly miners, however, were unanimous against striking when the union sent a committee to call the strike. The trail to the mine was guarded by five miners armed with rifles, who halted all comers and refused to allow the labor agitators to approach the property.

(*From Our Special Correspondent.*)

Mining Conditions.—At Telluride practically no large properties are working, and how long the strike will continue is a matter of conjecture. The miners' union will not recede from its request for an 8-hour day for millmen, and the mine managers affirm they will continue to keep their plants closed rather than submit to the dictates of the union. The situation has been practically unchanged since the millmen walked out on September 1, and there is little probability of the trouble being settled before next spring. Everything is very quiet, and the majority of the miners that were forced to quit work have sought other fields. The union has established a commissary and lodging houses, and is boarding the idle men at actual cost.

Several small properties are being steadily worked, and unless something unforeseen turns up the men will not be called out.

Alta.—This was the last property closed by the union, and at present no work is under way. Manager A. C. Koch, however, expects to put a small force on development.

Keystone Placer.—This property has been steadily operated, and a recent clean-up was beyond the expectations of the company. This is the first season that the mine has worked at a profit. C. M. Coleman is secretary-treasurer and general manager.

Liberty Bell.—Work on the new crosscut tunnel, ¾ of a mile down the mountain from the upper workings, is steadily prosecuted. An air compressor and machine drills were recently installed. A few men are employed, and superintendent Charles A. Chase expects to continue development all winter.

Mayflower.—This mine, in Bridal Veil basin, was opened this summer, and the company is now employing about 30 men. An electric motor and hoist have been ordered, and work will continue all winter.

Nellie.—Four or five men are all that are employed at present. Cooper Anderson is manager.

Smuggler-Union.—No work at all is done at this mine, and only a few watchmen frequent the buildings. The big mill at Pandora had its bins cleaned out on September 12. Bulkely Wells is manager.

Tomboy.—This company is employing 60 men on development in the Argentine and Red Cloud mines, but no ore is being extracted for treatment, and the big mills are both closed. J. Herron, of Telluride, is manager.

SUMMIT COUNTY.

Peak No. 10.—The recent strike of high-grade silver ore made here is reported proving up well. The vein varies from 1 to 2 ft. in width. The property is owned by Judge W. M. Clark, of Denver, and Eli Fletcher, of Breckenridge. Mr. Fletcher, Charles Marz and Paul Burdett have a lease on the property.

Ten-Mile Mining and Leasing Company.—This company is reported to have struck ore recently and is shipping 25 tons daily. Sixteen men are employed. The company has been working 2½ years. H. M. Shepard is manager.

TELLER COUNTY.

Pharmacist Gold Mining Company.—At the annual meeting recently at Cripple Creek 1,217,019 shares of the 1,500,000 were represented. The following officers were elected: A. D. Jones, president; E. E. Whitmond, vice-president; W. J. Henderson, secretary; W. F. Rock, treasurer. The fifth director is J. F. Lilly.

(*From Our Special Correspondent.*)

Miners' Strike.—The men are gradually returning to work. More mines have started, and more are expected to start soon. Several new camps have been established by the militia, on account of the mines starting, and one or two new companies have been sent to the district. The troops have been supplied with new rifles from the United States arsenal. There is some dispute between the civil and military authorities, with regard to holding prisoners arrested by the latter, and several writs of habeas corpus have been issued by the district judge. The military authorities are making every effort to suppress all lawlessness and also to ferret out the men guilty of a number of crimes that were committed. Among the mines recently started are the Anchoria-Leland, Shurtloff No. 2, and others. The Elkton is working as many men as it did before the strike. Stratton's Independence is preparing to start, and will begin operations soon. The mine owners are standing together and have stated that they will in no way treat with any member of the Western Federation of Miners.

IDAHO.

IDAHO COUNTY.

American Flag and Hercules.—W. H. Adams, of the Adams-Walker Company has taken a two year working bond on these groups near Elk City for $35,000. Five men are working on each group.

Dewey.—This mill is operating again with a full force.

SHOSHONE COUNTY.

Chicago & Pierce City Mining Company.—The controlling interest in this company is owned by E. J. Bowers, of Spokane; William Dahl, of Pierce City, and S. S. Johnson, who is manager. A $10,000 plant has just been installed and will be ready in October. It has a capacity of 1,500 yds. of dirt a day. The property is about four miles from Pierce City.

Crown Point.—For 60 days from the middle of September this mill will treat the ore of the O. K. mine. Crown Point is doing development work and will not be using the mill, which has a capacity of 60 tons daily. It is the intention of the O. K. owners to erect a mill and the principal reason for the trial run at the Crown Point mill is to learn the kind of a mill required.

Hercules.—A rich strike of galena—the same high class ore found in the upper workings—is reported in the lower tunnel. Only the crude ore is shipped and is said to give a net return of over $30 a ton. Before the ore reaches the railroad a 2-mile haul is necessary, entailing an expense of $2.50 per ton. The shipments last year were 4,998 tons, the gross value being $394,629. The cost of extraction was $65,900. Other expenditures were freight and reduction, $240,930; repairs and construction, $18,863. This left a net profit of $169,527 for the 4,998 tons. The Day family is said to own three-eighths; Paulson, one-quarter; Al. Hutton, three thirty-seconds; the Markwells, three thirty-seconds; C. H. Reeves and D. Cardoner, one-sixteenth each; H. F. Samuels and F. M. Rotherock, one thirty-second each. The mine is at Burke.

INDIANA.

SULLIVAN COUNTY.

Willfred.—Paul Wright & Company, Chicago, have secured this mine at Willfred, and will have the exclusive agency for the coal mined at that point, amounting to over 800 tons daily. Formerly the mine was owned jointly by Paul Wright & Company and Harmon & Black. It is supplied with electric machines and a box-car loader was recently installed. The capacity is to be increased to 1,000 tons daily. The board of directors has been reduced from six to five members and includes Paul Wright, president; William H. Trow, secretary; Harry P. Hafer, vice-president; W. S. Freeman and Fred W. Black, treasurer and general manager.

KENTUCKY.

Great Northern Coal and Coke Company.—This company was recently organized with a capital stock of $10,000,000 and is said to own 500,000 acres of coal lands in Jackson, Pike, Floyd and Martin counties, and to be promoting a new railroad through that district. It proposes to ship coal by rail, as well as down the Big Sandy and Ohio rivers. Elevators and tipples are to be erected at Maysville for transferring coal into barges for the trade along the Ohio and Mississippi rivers. The land and railway headquarters will be in New York, their shipping headquarters at Maysville, and their selling headquarters at Cincinnati. The temporary organization includes J. N. Camden and Sprigg Camden, of Parkersburg; P. I. Kimberly, of Sharon, Pa.; F. A. Dinley and Robert Nomlon, of Chicago; George C. Howe, of Duluth, and J. C. Mays, of Paintsville, Ky.

WHITLEY COUNTY.

Cumberland Coal Company.—This company which was recently organized, has established its headquarters at Williamsburg, and will operate in that district.

MICHIGAN.

IRON—GOGEBIC RANGE.

Iron Belt.—This mine which has been shipping since 1888 has closed permanently and will be dismantled.

Meteor.—This mine is being pumped out and will be re-opened by Oglebay, Norton & Company.

IRON-MARQUETTE RANGE.

Negaunee.—Final payment of the $1,500,000 bonus has been made to the fee owners of this mine by the Cleveland-Cliffs Iron Company and the property has passed into the hands of that company. The Oliver Iron Mining Company operated the property until a year ago, when a lease was given on the basis of a bonus of $1,500,000, and a 30c. per ton royalty to the Cleveland-Cliffs Iron Company.

IRON—MENOMINEE RANGE.

Oliver Mining Company.—This company has decided, it is said, to mine what is in sight at the Michigan, and then, if explorations underground do not show ore, to abandon it finally. At Gibson the company will continue prospecting.

Scott Iron Mining Company.—This company has been formed at Iron Mountain to explore a part of section 10-40-30, where two old shafts are in ore.

MONTANA.

LEWIS & CLARKE COUNTY.

Doggett.—The Northwestern Exploration Company has taken a bond on this group of 8 claims at Diamond City.

Eclipse-Argo.—The concentrator at this mine in Hellgate canyon near Helena, is reported turning out

10 tons of concentrates a day, which are said to average 30 per cent copper with small gold values.

Iron Lode.—This mine in the Scratch Gravel district, 4 miles from Helena, has been re-opened for the purpose of shipping flux to the East Helena smelter.

Jay Gould.—The Standard Ore Company, of Helena J. Campbell Cory, president, has begun work at this mine in the Marysville district. The values are principally in gold and silver and the average of the shipments made from the old workings was $40 per ton. A 100-stamp mill will be placed on the property, a cyanide plant being already installed. The best showing is at the 500-ft. level where the vein is from 15 to 20 ft. wide.

Josephine.—C. D. McClure, who has control of this mine in the Cataract district, will resume work.

MADISON COUNTY.

Kearsarge.—This company is to transport the Kennett mill 60 stamps, to Summit, at the head of Alder gulch to work the Kearsarge ores. A telephone line will be run up the gulch from Virginia City, where offices and other buildings will be constructed. The company owns all the ground on the east side of Alder gulch between Bachelder and Spring gulches, and about midway between the two a tunnel will be driven under the Oro Cache hill for a distance of 1,000 ft. or more.

MISSOULA COUNTY.

Monitor.—This property near Saltese, owned by the Montana Consolidated Mining Company, was bonded by the Bitter Root Copper Mining Company and $40,000 had been paid on account. The second payment of a like amount was not met and the owners have assumed possession. A crew of 18 men in charge of A. McCullum, of Wallace, is now at the property sinking the shaft.

NEVADA.

ELKO COUNTY.

The strike at Searchlight has now been on nearly three months. The union sanctions prospecting and development work, but places producing mines under the ban. Some contract work is still in progress.

NEW JERSEY.

HUDSON COUNTY.

Arlington Copper Company.—The mine at Arlington is to be sold on September 30, with all improvements. It will be remembered that a fine plant of machinery was installed to treat the low grade sulphide and carbonate ore by leaching and electrolysis, but the results obtained experimentally were not realized, as the sulphuric acid solution used did not penetrate the roasted and pulverized ore. The plant practically did not produce a pound of copper, and was closed shortly after being completed.

NEW YORK.

CLINTON COUNTY.

Arnold Hill.—A separator having a capacity of 200 tons a day will be built at this mine at Ferrona, which is leased by Pilling & Crane, of Philadelphia.

NORTH CAROLINA.

JACKSON COUNTY.

Carolina Copper Company.—The head office of this concern is in the Home Bank building, Detroit, Mich. The company has installed a boiler, hoists, pumps, Sullivan air compressor and air drill for sinking a double compartment shaft now down 70 ft. The mine is about 16 miles south of the Southern Railway, at Cullowhee, on a ridge between Tuckasiegee river and Cullowhee creek. The ore runs in copper with gold and silver values. The company intends to install a smelter if development work is satisfactory. Thomas A. Cox is secretary and superintendent.

OREGON.

WASHINGTON COUNTY.

Dixie Meadows.—A 100-ton concentrating mill is being installed at this property and is expected to be in operation the middle of October.

PENNSYLVANIA.

Pennsylvania Railroad Company.—Shipments of coal and coke on the company's lines east of Pittsburg and Erie, for the week ending September 5, and year to date, are officially reported as below, in short tons:

	Week.	Year.
Anthracite	72,998	3,109,855
Bituminous	558,970	18,745,863
Coke	186,447	6,748,465
Total	818,415	28,604,183

Compared with the corresponding period in 1902 the total shipments this year show an increase of 1,492,788 tons anthracite, 1,117,786 tons bituminous, and 91,973 tons coke, making a total increase of 2,702,547 tons, or 10.5 per cent.

BITUMINOUS COAL.

Erie Coal and Coke Company.—This company has been chartered with a capital stock of $150,000 with these stockholders: Harvey M. Barkley, Somerset; Parry Miller, E. J. Boyles, John Maul, W. N. Moser, Clyde Rowe, C. E. Deal, Frederick Rowe, E. M. Beachley, J. C. Reed and Levi Deal, all of Meyersdale, Pa., and W. A. Merrill, of Garrett, Pa. The company has purchased the Turner coal mines at Ferris.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Branch Mint Gold Mining Company.—Work on the building for the 40-stamp wet crushing cyanide mill has begun.

Clover Leaf Gold Mining Company.—A water course was struck last week on the 600-ft. level, and the small pump on that level proved inadequate. The 700-ft. level was soon drowned out, and the men were swimming on the 600. A large pump has been lowered to the 600-ft. level, and the water is now under control, although no work will be possible below the 600-ft. level until auxiliary pumps can be installed.

Deadwood-Standard Gold Mining Company.—The second clean-up for September is given as over $5,000. The annual meeting of the stockholders will be held in October.

Gladiator Consolidated Mines and Milling Company.—The new machinery (hoist, air compressor and drills) is in use in Deadwood gulch. A tunnel is being driven.

Golden Crest Mining Company.—The 10-stamp cyanide plant will start soon.

Hidden Fortune Mining Company.—The new cyanide plant will probably be ready on October 1. It is being remodelled, and amalgamating plates will be used for a second treatment of the ore. The Bingham shaft is 300 ft. deep, and cross-cutting has begun.

Imperial Mining Company.—At a recent meeting these directors were elected: W. S. Elder, of Deadwood, president; R. S. Jamison, Deadwood, secretary and treasurer; Mark Hirsch, Kane, Pa.; M. J. Gallup, Mt. Jewett, Pa.; W. W. Jamison, Greensburg, Pa.; J. S. Beacom, Greensburg, Pa., and A. J. Cochran, Dawson, Pa. The cyanide plant in Deadwood is making a test run on ore from the old dump at the Sitting Bull-Richmond mine, in Bear Butte district, owned by Henry Earle, of New York City.

Oro Hondo Mining Company.—The shaft is down 600 ft., and a station is being cut preparatory to drifting.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

National Smelter.—Ore is being received from the Ben Hur mine of the Horseshoe Company, and the smelter is running steadily. The Penobscot Mining Company, of Lawrence county, is to ship its ore to this plant. The flux is from the Montezuma and Whizzers mines, near Deadwood.

TENNESSEE.

DAVIDSON COUNTY.

Nixon Coal Company.—This company has commenced the development of its coal property at Flat Rock. W. J. Nixon is manager and expects to open a mine which will produce 200 tons of coal daily.

WASHINGTON COUNTY.

Virginia Iron, Coal and Coke Company.—The furnaces and shops at Embreeville, formerly owned by this company, have been purchased by C. B. Perin, of Knoxville, who will operate the plant under the name of the Embreeville Iron Furnace Company. The plant has a capacity of 175 tons.

UTAH.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Majestic.—The sampling mill at the new smelter has started. The blowing in of the lead furnaces has been delayed on account of the inability of the San Pedro Railway to build some necessary switches and spurs. Manager Alexander states that the furnaces will be in operation by October 1. The copper furnaces will be started soon after.

Newhouse Mines and Smelters Company.—The reservoirs and branches of the pipe line at the headwaters of the Wah Wah springs are completed. Pipe laying in the trenches across the Wah Wah valley will begin before October 1. The mine has been explored to the depth of 600 ft. and along the strike of the Cactus vein for a distance of 600 ft. present development is said to show a great tonnage.

Royal Gold and Copper Company.—A. B. Lewis, the president, has announced that arrangements are being made to place $2,000,000 worth of gold bonds, bearing 6 per cent. interest, the issue to run five years. This fund is to pay for development work. The company is capitalized at $10,000,000, par value of shares $10 each.

GRAND COUNTY.

Inter-State Mining Company.—This company has placed an order for a milling plant, the first to be erected in the La Sal mining district.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—Shipments during the week ending September 11, were: Carisa, 3; Centennial-Ureka, 31; Bullion-Beck, 4; Gemini, 6; Grand Central, 30; La Clede, 1; Lower Mammoth, 1; Mammoth, 15; Martha Washington, 1; South Swansea, 1; Star Consolidated, 3; Rising Sun, 1; Tetro, 2; Uncle Sam, 4; Victor Consolidated, 4; Yankee Consolidated, 1; Black Jack, 3; Dragon Iron, 7; Whiting, 3; Noon's 4; May Day, concentrates, 2; total, 127.

Godiva.—Work is soon to begin at this property as a result of the Tetro strike. The erection of a concentrator for the low grade ores is discussed. John Q. Packard, of Salt Lake, is the principal owner.

Little Chief.—The vein disclosed a little above the 800-ft. level shows up well, but the ore is not uniform. The Snowflake Company claims the find was made on its territory.

Tetro.—The ore body recently encountered improves with development, and is believed to be an extension of the Humbug vein. Two carloads recently gave returns of 43 per cent lead and 44.7 oz. silver.

Uncle Sam Consolidated.—Excavations for the new concentrator are completed and work on the structural parts begun.

Utah.—This mine is at Fish Springs, in the Deep Creek district. The officials state that the property was never in a better physical condition.

Yankee Consolidated.—Some good ore is in the shaft below the tunnel level. A carload brought over $1,200. The lot was not sorted.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated.—Copper shipments for the week ending September 17 aggregated six cars, 240,000 lb.

Bingham Consolidated Smelter.—The copper bullion shipments for the week ending September 11 aggregated 3 cars, 180,000 lb.

Columbus Consolidated.—This company has awarded a contract to J. J. Burke, of Salt Lake City, for the construction of an electric power plant in Little Cottonwood canyon to cost $40,000.

Columbia Copper Mining Company.—The property has been sold to an Ohio syndicate for the stated price of $225,000. Among the purchasers are Henry Caitrow, Major H. G. Caitrow and O. A. Tibbetts, all of Dayton. The latter will serve as consulting engineer. The company will be reorganized and steps taken to erect a concentrator of 500 tons daily capacity. Major Caitrow will be business manager. The transfer takes place on October 1.

Erie.—Arrangements have been made to develop this property through the Mystic Shrine tunnel. J. W. Cairns, of Salt Lake City, the manager, has let a contract for 100 ft. of drifting.

Superior-Alta Mining Company.—This company has been incorporated to work the Hellgate group at Alta. The officers are J. A. Jacobson, president; Walter L. Maas, secretary and manager, who, with Mrs. W. L. Maas, Toney Jacobson and L. A. Jeffs, all of Salt Lake City, constitute the board of directors.

United States Smelter.—Copper bullion shipments for the week ending Sept. 17 amounted to three cars, 181,000 lb.

Utah Consolidated.—Manager Channing states the present output of the mines, 500 tons per day, will not be increased until the plant is enlarged to 800 tons per day.

Utah Consolidated Smelter.—Copper bullion shipments for the week ending Sept. 17 were, five cars, 300,000 lb.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Comstock.—The stockholders at a recent meeting decided to reject the proposition submitted by the directors to consolidate with the California, an adjoining property. The vote was almost unanimous. A vein has been cut in the shaft at a depth of 350 ft., but its importance has not been ascertained.

Daly-Judge.—The mine is closed pending the laying of new tracks and making repairs to the Anchor tunnel through which the ores go to the mill.

Wabash.—President N. Treweek has given orders to sink the shaft to 1,000 ft.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Consolidated Mercur.—The slimes plant at the company's mill is going in commission. The Moore system is used.

Sunshine.—The mine and mill are closed on account of financial difficulties. The company is said to owe $7,500 in back wages.

WASHINGTON.

CHELAN COUNTY.

Banner Gold and Copper Mining Company.—At the annual meeting held recently in Chelan, the old officers, Dr. J. L. Jacobs, president; R. W. Eager, secretary; C. H. McNider, treasurer; trustees, J. L. Jacobs, R. E. Jacobs, R. W. Eager, were re-elected. The company voted to put in a power plant compressor and drills. Water power will be used. There is a tunnel in 101 ft. The property is on Meadow creek, about three-quarters of a mile from Lake Chelan, and 39 miles from Chelan.

FERRY COUNTY.

(*From Our Special Correspondent.*)

Republic Ore Shipments.—During the week ending September 12, 40 cars of ore or about 1,200 tons were shipped as follows: Mountain Lion, 24 carloads to the Hall mines smelter of Nelson; Quilp, 12 cars to Tacoma; North San Poil and Knob Hill, 1 carload each to the Hall mines smelter, and Zala M., 2 carloads to the Crofton smelter.

Belcher.—The No. 3 tunnel is now in 275 ft. The company has lately improved one of the old roads, reducing the distance to the railroads from 18 to 12 miles.

Golden Eagle Mining Company.—A hoisting plant has been installed good for a depth of 500 or 600 ft. A pump housed on Eureka creek, 600 ft. down the hill, lifts water to 2 tanks, which, combined, hold 10,500 gal. and supply a 60-h.p. boiler and 40 residence buildings on the company's ground. Work on the shaft has been resumed. (As the stock of this company is principally held in New York, I will try and furnish you full particulars of the plant and object next week.)

Hidden Fortune.—Quarters have been built for an extra force, and winter supplies have been sent to the mine. A tunnel in 170 ft. has cut 3 veins. The first 3-ft. wide and the second 4-ft. wide; another vein may be found about 25 ft. further in. Another is expected 250 ft. further in, which crops out 20-ft. wide and assays from $8 to $200 per ton. The ore all runs in gold, silver, copper and lead, silver predominating. This property is at Park City on the south half of the Colville reservation. Fifty tons of ore on the dump will average $55 per ton.

Mountain Lion.—The returns from two lots of ore show gross values of $11.65 and $13.50 per ton.

North San Poil.—On the 150-ft. level the north drift on the vein is in 80 ft., with 5 ft. of shipping ore in the face. Free gold and horn silver are visible in some of the rock. Ore is being stoped on the 100-ft. level. The mine shipped a carload to the Hall mines smelter, Nelson, B. C., on September 15.

Quilp.—The ore body in the winze below the No. 5 level is said to be from 20 to 36 ft. wide. The superintendent reports the mine to be looking better than ever. About 30 men are on the pay roll.

Strawberry Creek Placers.—The Seibert brothers of Alkire, have prospected these placer mines on Strawberry creek, on the south half of the Colville reservation with good results. All the gold obtained is rough.

Trade Dollar.—Stoping of ore continues on the 200-ft. level south of the shaft, where the pay shoot is widening.

Zala Consolidated Mining Company.—A small hoist and sinking pump are in course of installation on the 300-ft. tunnel level. At present 15 men are engaged. The winze below the 300-ft. level is now down 55 ft F. W. Rolt, of Rossland, B. C., is secretary.

Zala M.—Ore is being stoped on and above the 300-ft. level. Below this a winze has followed shipping ore 3 ft. wide to a depth of 55 ft. Work was suspended to install hoisting machinery. Much of the ore formerly thrown out on account of being too low grade is now shipped over a new route to the railroad. Shipping is irregular on account of trouble in getting teams to haul the ore. At present 15 men are employed.

OKANOGAN COUNTY.

(*From Our Special Correspondent.*)

Favorite.—A tunnel has been driven about 700 ft. on a vein of concentrating ore 2 to 7 ft. wide.

Nighthawk.—The lower tunnel has passed through another vein of quartz 2 ft. wide.

Prize Mining Company.—H. E. Dunham, manager, reports that the company is building at Nighthawk a 20-ton mill to treat ore from the Surprise group of claims, by the Tatro-Delius process. The machinery is in transit from Seattle. The company owns 22 claims on the southwest side of Mount Ellemeham, a water right and 233½ acres of bottom land, part of which is for a millsite. The Mollie Gibson, Lave View and Contact claims have the principal showings. A vein from 2½ to 3 ft. wide produces gold, silver and copper in chlorides and sulphides. This is opened by a shaft, 2 tunnels, up-raises and winzes in ore. Three tons ran $141 per ton. A former shipment worked at the Black Bear mill, near Loomis, gave a gross return of $25 per ton.

Ruby.—The vein near Nighthawk is opened on two levels by a cross-cut tunnel. The ore, antimonial silver, forms in lenticular bunches. On the upper level the vein has been opened for 175 ft. and on the lower, 375 ft. Two shifts are employed on drifting in the lower level and stoping ore.

Similkameen Falls Power and Development Company.—The tunnel and open cutting for the channel and tail-race at the Similkameen falls are well under way, and electrical machinery and a turbine water wheel to generate 500-h.p. have been hauled to the falls. Another 500-h.p. wheel may be added and eventually 10,000-h.p. developed for mining, milling, irrigating and lighting purposes. A pole line is under construction to the Six Eagles, Night Hawk and Ruby mines, the new town of Nighthawk and the Golden Zone mill.

Six Eagles.—At this property near Nighthawk a well-defined vein of quartz carries values in gold, silver, copper and lead. Drifting on the 120-ft and 200-ft. levels from an incline shaft 210 ft. deep, shows concentrating ore, values principally gold. A tunnel driven about 750 ft. passed through 8 ft. of $8 ore and 40 to 50 ft. further in a streak of $12 ore 18 in. thick; it is now in about 1,500 ft. and is expected to strike the main vein at about 100 ft. further.

SKAGIT COUNTY.

Post-Lambert.—The 10-stamp mill at this mine north of Baker handles 35 tons of rock daily. The mill has 1,000-lb. stamps, with concentrators below plates. A 4,000-ft. aerial tram connects the mill and mine. The quartz vein is from 4 to 5 ft. wide, and is said to carry tellurides and free gold. The mine has been developed by 2,000 ft. of tunnels, drifts and raises.

WEST VIRGINIA.

OHIO COUNTY.

Beechbottom Coal Company.—This company of Wheeling is reported to have sold its holdings to James S. Braddock, of Mt. Pleasant, Pa., for $240,000. Several other men are interested.

Glen Easton Coal and Coke Company.—The shaft being sunk by this company is expected to be ready by December 1. Electric machines will be used and will cost $45,000. In addition 800 coke ovens will be built. The company has 2,000 acres in its Glen Easton tract.

FOREIGN MINING NEWS.

AUSTRALIA.

WESTERN AUSTRALIA.

(*From Our Special Correspondent.*)

Golden Horseshoe.—This mine, though losing by the Boundary twisting at the 1,000-ft. level is still getting good grade ore on its side of the boundary, and possibly this famous lode has split into two bodies. The ore reserves in the Horseshoe are now estimated as worth £1,750,000—down to the ninth level.

Great Boulder Perseverance. This mine may not keep up its 30 dwt. average, many local mining men thinking 25 dwt. would be a safer average. Great confidence is felt generally in the management and in the immense bodies of high-grade ore opened down to the 900-ft. level.

Sons of Gwalia.—Under the management of W. J. Loring this property is rapidly being brought to a satisfactory point as regards economy. The number of men has been reduced and working costs generally have been brought down. Ore reserves are now estimated at 200,000 tons in sight, a very large increase since Mr. Loring took charge. The mine generally is looking well.

CANADA.

ALBERTA.

Frank.—A large amount of development work has been done the past three months on this coal mine, a Frank, and two new mines are being opened to repair the losses sustained by the landslide last spring. At present 300 tons of coal are shipped daily and it is expected in a short time the production will be increased to 1,000 tons daily. One of the new shafts being sunk is 4,000 ft. from the old tunnel and is down 230 ft. It is proposed to sink it to a depth of 600 ft. after which drifts will be run.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—The shipments for the week ending September 12 were as follows: Granby mines to Granby smelter, 1,148 tons; Snowshoe to Sunset and Granby smelters, 2,880 tons; Mother Lode to Greenwood smelter, 3,250 tons; Emma to Nelson smelter, 264 tons; Oro Denoro to Sunset smelter, 759 tons; Athelstan to Sunset smelter, 180 tons; Providence to Trail smelter, 21 tons. Total for week, 9,782 tons.

Granby Consolidated.—Construction work has practically ceased and the enlargement of the smelter to 6 furnaces has been accomplished without the creation of any floating debt.

BRITISH COLUMBIA—CARIBOO DISTRICT.

Minnesota Silver Company.—The present staff of the Ivanhoe mine of this company at Sandon will be increased to about 60 miners, and the concentrator will work day and night. The mill has been given an over hauling for an extensive run and improvements are under consideration for perfecting zinc milling.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending September 12 were as follows: Le Roi, 5,220; Centre Star, 1,710; War Eagle, 1,380; Le Roi No. 2, 220; Jumbo, 330; Spitzee, 60; I. X. L. (milled), 50; total for week, 8,970. For the week ending September 19 shipments were: Le Roi, 6,000; Centre Star, 1,500; War Eagle, 1,230; Le Roi No. 2, 320; Jumbo, 250; Spitzee, 30; I. X. L. (milled), 250; total for week, 9,580. For year to date, 277,407 tons. The 4,000-gal. oil tanks for the Elmore process at the Le Roi No. 2, concentrator were charged and the plant has started work.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Idaho-Alamo.—A new tram is to be constructed at once on this property.

BRITISH COLUMBIA—VANCOUVER ISLAND.

Contlee Coal and Iron Company.—This company was recently incorporated with a capitalization of $100,000, shares 5c., to handle coal mines and iron deposits in Washington and British Columbia. The incorporators are E. M. Warher, C. E. Scriber, H. H. Wheeler, Daniel Lienbach, John Lloyd, Thomas Oliver and George Palmer, all of Colfax, Wash. The company has acquired six sections of land in the Nicola coal basin, 150 miles northeast of Vancouver, and adjoining the coal property of Nelson Bennett, and may begin work soon with a diamond drill.

ONTARIO—HASTINGS COUNTY.

(*From Our Special Correspondent.*)

Craig.—This mine, about three miles north of Bannockburn, is a low-grade free-milling gold property.

Gauley.—Another attempt is being made to work this old gold mine at Malone.

Laudenberger.—This gold mine, near Gilmore, is reported sold, as also the Pierce talc mine, near Madoc.

Madoc Mining Company.—This company is shipping 4 to 5 carloads per week from its pyrite mine, east of Bannockburn.

Ontario Mining and Smelting Company.—This company has started its furnaces on hand-picked galena and reports some 1,500 tons on the dump. The crusher and concentrator will be ready by October 1. A new Knowles sinking pump arrived last week and sinking will be continued double shift. The company has secured all the available properties in the vicinity of Bannockburn.

MINING STOCKS.

(Full quotations are given on pages 490 and 491.)

New York. Sept. 24.

There is still a feeling of uncertainty in the local stock market, which at times causes depression and a consequent drop in prices. The feature has again been United States Steel common stock, which made a new low record on September 21, when the price slumped to $16⅞, and liquidation was heavy. Since then, however, the stock has recovered, and closed on Wednesday at $17⅝, although it sold at intervals as high as $18⅜. Steel preferred shares were less active, but sympathetically weak, the extreme quotations being $67⅜ and $69. Rumors are contradictory, and on curb the next dividend on common has been offered at 75c. and bid for at 62½c., which compares with $1 paid this month. Doubtless the unsteady position of the iron and steel trades is directly responsible for and best explains the weakness in these securities.

In the copper section Amalgamated fluctuated between $46¼ and $41⅛, and showed the larger volume of business at the end of the week. Anaconda was in better demand, selling from $19 to 17 9-16. On curb Greene Consolidated, of Mexico, reported increasing sales at the decline from $18¾ to $17¾, closing on Tuesday at $18. Tennessee slid off a fraction to $27½. White Knob, of Idaho, is now down to $9½, after having sold above $10.

A sale of Onatrio Silver, of Utah, has been made this week at $4.75, which is below the average. Quicksilver preferred, of California, reappeared at $5.75.

In the Colorado gold list hope is centered in the Cripple Creek drainage tunnel, which is expected to improve the earning power of such properties as Elkton, El Paso, Moon Anchor and others in which eastern stockholders are interested. Elkton sold this week at 46c., and Moon Anchor at 12c. Portland lost 2c., to $1.28. The Leadville silver shares are being benefited by the improvement in the metal market.

In the Comstock group Consolidated California & Virginia changed hands at $1.35; Ophir, $1.75@$1.85; Best & Belcher, $1.70@$1.68; Mexican, $1.20, and Caledonia, 95c. Silver Hill sold at 70c., ex-dividend of 5c.

Boston. Sept. 22.

(From Our Special Correspondent.)

This market represents nothing but momentary trading, with Copper Range and Old Dominion Mining occupying the center of the stage. Business in Copper Range has been on a smaller scale since the completion of the Tri-mountain deal. About 80,000 shares of Tri-mountain have been exchanged for Copper Range, and it is expected that the majority interest will turn over about 90,000 shares. A premium is bid for odd lots of Tri-mountain. Copper Range has fluctuated from $58.50 to $54, closing $1.50 below a week ago at $54.37½.

Old Dominion made its low record at $7.25. The management is severely censured for its methods and a good deal of selling by dissatisfied interests is reported, although some good blocks of stock have been taken off the street. A plan is offered by the management to recoup the company with financial needs. It provides for the organization of a holding company to be known as the Old Dominion Securities Company, with 75,000 shares, par $10, which will receive $750,000 6 per cent. 10-year bonds of the Old Dominion Mining Company and 50,000 shares of treasury stock of the latter as a basis for issuing the Securities Company stock. The holding company's stock will be offered to Old Dominion Mining shareholders at par, less 50c. per share commission to those who desire to become underwriters on the basis of one for two Old Dominion Mining. Payment will run for 10 months. Old Dominion stockholders will meet to authorize this action. It is felt in some circles that the company should be reorganized and assessed, which would be the direct way of getting the needed funds.

Bingham Consolidated has lost $2 to $22 on limited offerings. Calumet & Hecla is off $10 to $440. The latter has filed a statement with the State under a new law showing a surplus of $22,466,163 June 30, while the issued capital is but $1,200,000 Osceola sold at $58@$56.50. Utah has held steady at $25.50@$25.87½. Another $1.50 dividend is looked for, making $3 this year. Dominion Coal fell $3.25 to $69, but recovered to $72. Dominion Iron & Steel in the meantime has risen $2.50 to $12.75. A circular issued by the latter company states that the liabilities, which are now $4,484,961, will be reduced almost $2,000,000 when the two companies are separated. This would leave liabilities of $2,504,961, against which there are cash assets of $2,232,479. Advices from the West state that the Consolidated Mercur Mining Company has not taken any action regarding the resumption of monthly dividends. They were passed four months ago. The stock is quiet at $1.25 per share. Shannon Copper has displayed strength by advancing to $10. As a rule mining shares are fractionally lower all around from a week ago.

Colorado Springs. Sept. 18.

(From Our Special Correspondent.)

The market at the close of the week is rather weak. In a few cases, prices have stiffened somewhat, but the majority of the stocks have either remained stationary or suffered a decline. This condition is no doubt caused by the failure of mine owners and miners in the Cripple Creek district to effect a compromise of the labor troubles. The mines now operating are making a good production, but the uncertainty as to the duration of the strike influences investors to withhold their buying orders for the time being.

C. K. & N. manifested some strength, selling from 18c. to 18½c. Elkton followed the same example, the bid price advancing from 45c to 46½c.; no stock, however, selling at the higher figure. El Paso declined fractionally; 60c., the bid price a week ago, changing to the offered price to-day. Gold Dollar also weakened to about the same extent. Isabella maintained the decline started last week and was freely offered at 11¼c. Moon Anchor advanced from 10c. bid last week to 10½c. to-day. Portland closed weak, selling at $1.20 with $1.19½ bid. Work was stationary at 5¼c. Golden Cycle sagged from 67c. to 66c., but regained the former figure to-day. Among the prospects, Old Gold was in favor, selling from 6⅞@7c. all week. The miscellaneous list was inactive.

Salt Lake City. Sept. 19.

(From Our Special Correspondent.)

The sales for the week $107,824.25. Tintic stocks again took the lead and in fact, few others were considered. Star Consolidated registered the heaviest transfers, 58,950 shares going. Early in the week brokers bid 41c. for Tetro, but this was only for a day, when the price relaxed, ending slightly above last week's close. Yankee Consolidated stiffened considerably, advancing from 58c. to 70c. Little Chief rose to 18c., but afterwards dropped one-half. New developments in the mines influenced the prices to advance in all cases. Possibility of litigation with a neighbor caused Little Chief to tumble. Grand Central directors decided to pass the September dividend and that stock received but little attention. Utah went up 16c. The directors met on September 17 and decided to resume the payment of dividends and will pay 1c. per share regularly. A strike on the 300-ft. level of the New York Bonanza, sent that stock higher. Daly-West ended somewhat stronger.

San Francisco. Sept. 14.

(From Our Special Correspondent.)

Comstock shares at the end of the week were somewhat steadier than usual, but the long list of assessments will likely cause a re-action.

Some quotations noted are Consolidated California & Virginia, $1.55@$1.57½; Ophir, $1.80; Mexican, $1.05@$1.10; Caledonia, 96@91c.; Sierra Nevada, 68c.

The sworn statements of the mining companies, as filed in their office this week in compliance with law showed cash on hand September 1, as follows, with all expenses paid, unless otherwise mentioned: Alta, $1,1.. with indebtedness of $1,573; Alpha Consolidated $3,191; Andes, $6,584; Belcher, $4,578, with liabilities of $1,000; Best & Belcher, $2,687, with bills payable of $2,500 on account of mill purchase; Bullion, $268 Caledonia, $168, with August expenses at mine unpaid; Confidence, $1,985, with August mining expenses unpaid; Consolidated Imperial, $246; Crown Point, $34; Consolidated California & Virginia, $31,809; Challenge Consolidated, $661; Consolidated New York, $2,461; Exchequer, $1,793; Gould & Curry $2,897, with bills receiveable of $2,500 on account of mill sale; Julia Consolidated, $238; Justice, $4,717, with August expenses at mine unpaid; Lady Washington, $104, with liabilities of $500; Mexican, $45, with indebtedness of $2,000; Ophir, $784; Overman, $7,111 with August expenses at mine unpaid; Savage, $4,... Segregated Belcher, $687; Silver Hill, $20,513; Sierra Nevada, $4,904; Syndicate, $2,688; Standard Consolidated, $106,808 (balance does not include the final bullion returns for August, and mine expenses for the month unpaid); Union Consolidated, $77; Utah Consolidated, $367, with indebtedness of $2,000. Chollar owed $2,044, and Potosi, $2,606.

Assessments are being collected by Bullion, 5c.; Caledonia, 15c.; Crown Point, 10c.; Consolidated California & Virginia, 25c.; Challenge, 10c.; Julia Consolidated, 3c.; Ophir, 15c.; Savage, 10c.; Union, 10c., and Utah Consolidated, 10c.

On the San Francisco & Tonopah Exchange the usual favorites have been dealt in to a moderate extent. Belmont sold at $1.60; Montana at 95c.; North Star, 47@48c.; and Midway 43c. Esperanza showed the largest sales at 2@3c., being the cheapest stock on the list.

The Oil Exchange showed some business, especially in Oil City at 30c.; Superior, 6c.; Esperanza, $1.25; Monarch, 55c.; Kern, $5, and Monte Cristo, 80c.

COAL TRADE REVIEW.

NEW YORK, Sept. 23.

ANTHRACITE.

In the anthracite trade conditions during the past week have shown little change, except at points west of Chicago, where a brief cold wave stimulated buying temporarily. The output of the mines continues large, but it is not likely that the September shipments will equal those for October. It cannot be learned that any company has ordered its collieries on short time, but every company is taking advantage of the lull in demand to make needed repairs in breaker equipment before winter comes. It was not to be expected that the mines would continue getting out over 5,000,000 tons per month indefinitely, and the present falling off in buying causes little worry among those familiar with trade conditions. The supply of steam sizes is still in excess of market requirements, and until the demand for these sizes improves, many washeries will remain closed.

In the Northwest buying improved somewhat last week. The movement of coal from upper lake docks to date has probably been heavier than during any previous year in the history of the trade. Receipts of coal at the head of the lakes have been liberal for the past month, though the supply received so far is probably insufficient to last through the winter. The tying up by a strike of the fleet of the Pittsburg Steamship Company, may affect the situation, but it is likely that enough outside tonnage will be available to bring supplies at the head of the lakes up to all requirements before navigation closes. In Chicago territory receipts by lake have been heavy, and the docks will probably be filled before winter buying starts in earnest, or before navigation closes. Prices generally are firm at regular quotations, what few concessions were made by independent concerns often on coal under demurrage, not affecting the market materially. Along the lower lakes and in Canadian territory, while there is some complaint of a shortage of cars, buying has not improved much. The movement of coal up the lakes from Buffalo during September bids fair to break the record. Along the Atlantic seaboard the market is seasonably quiet. Those consumers who had enough storage room to take advantage of the monthly discounts, have now enough coal on hand to supply immediate needs. Not much improvement in buying can be expected therefore until the weather gets cold enough to compel those consumers who buy in small lots to come into the market. The return of the householders from vacation has been less a factor this year. Some of the independent producers, who have been selling coal at below regular prices, are closing down collieries or restricting shipments of coal all-rail to eastern territory. At points beyond Cape Cod most dealers are now pretty well supplied, even those having small yards who wanted coal a month ago. At New York and Philadelphia, the market continues quiet, and awaits colder weather. Prices for free-burning white-ash coal f. o. b. New York Harbor, are: Broken, $4.75; egg, stove and chestnut, $5.

BITUMINOUS.

In the Atlantic seaboard bituminous trade there has been little change in conditions during the past week, and the expected improvement in buying is coming very slowly. Although various industrial plants that have been tied by strikes are resuming work, yet the great majority of consumers show little anxiety to take coal. Car supply at the mines which was the ruling factor in the market at this time last year now cuts little figure, since shippers are able to get what cars they need to supply the slack demand.

At points beyond Cape Cod, consumers apparently have about all the coal they want at present, and shipments to that territory are mostly on contract orders. The shoal-water ports are not ordering as expected. Along Long Island Sound trade is, if anything, better than elsewhere, but the improvement in buying noted a week or two ago, does not continue steady. At New York Harbor points conditions are unchanged, and dealers can get all the coal they need without disturbing the tranquility of the market. In the all-rail trade buyers continue to take coal cautiously, and the cuts in prices previously noted continue.

Transportation from the mines to tidewater continues prompt, coal running through in less than a week. Car-supply at the mines is up to all demands. In the coastwise vessel market, while the storms of last week temporarily disturbed transportation, fair weather since has had its effect, and the demand for vessels is not strong, while freights are steady. We quote current rates of freight from Philadelphia as follows: Boston, Salem and Portland, 80@85c.; Providence, New Bedford and Long Island Sound, 70c.

Chicago. Sept. 21.

(From Our Special Correspondent.)

Wholesale and retail trade in anthracite have profited somewhat during the last week by the brief cold wave that caused many householders to think of their coal bins and start fires in furnaces and heaters, all over the western part of the Mississippi Valley. Sales were probably heavier than in any previous week for two months. The return of warm weather will perhaps make the rest of the month as dull as September is normally, but dealers have hopes that once the ball has been set rolling it will continue in motion for some time. Out-of-town business has been especially benefited by the weather, but in part this may be due to the activity of salesmen. There is no cessation in the accumulation of dock stocks here and at other lake ports; so that even with bad transportation, such as is generally looked for as soon as cold weather sets in, the prospects for the winter are good from the viewpoint of local dealers and consumers.

Bituminous sales also have been somewhat better, from a variety of causes, chiefly the better adjustment of supply to demand. Illinois and Indiana have picked up; sales of run-of-mine have been especially good, at $2@$2.25 and for the product of the best mines up to 50c. higher; lump brings $2.25@$2.50 and block $3@$3.25. Hocking is apparently being well held up to the circular prices of $3.90 for lump and $3.65 for run-of-mine, and sales are said to have been better, but there are rumors of cuts of 15 to 25c. on Hocking. Smokeless is selling slowly, and probably is subject to considerable discounts from the list prices of $4.20 for lump and $3.90 for run-of-mine. Indeed, sales of run-of-mine are reported on good authority to have been made at 40 to 50c. under the list price. Youghiogheny is in demand and the supply is good at $3.60@$3.75. There has been a brisk demand for cannel coal, at $5.50@$6.

Cleveland. Sept. 22.

(From Our Special Correspondent.)

The coal trade has been stronger. The starting of some of the factories has caused a better demand for steam coal, but it is evident that some producers are not doing the business they expected. There are fears that at the present rate of production in the soft coal fields there will be a surplus. The fall demand for domestic coal is beginning to look very good. Prices have stiffened, although with no advances.

The supply of coke has been good. There has been a little better demand due to the starting of some foundries which have been idle. The market, however, is by no means strong, because there are possibilities that some of the furnaces will be blown out at the end of this month, which will materially lessen the consumption. The prices have held about as they were, good foundry coke being held at about $3@$3.50 at the oven for 72-hour.

The movement of coal up the lake is likely to be affected by the situation in the ore trade and the sudden lifting of 112 boats out of the lake trade. If the cessation of ore movement is general the coal and grain freights will not keep the tonnage employed and other boats will be forced to the docks. The result will either be a decided increase in the rate of freight to the upper lake, or the sudden curtailment of the movement of the lake coal. The shippers are not over-pleased with the outlook. Fortunately for them the movement up the lakes to this date has been very heavy.

Pittsburg. Sept. 23.

(From Our Special Correspondent.)

Coal.—There is but little change in the coal markets. The mines are not operating full owing to the continued scarcity of railroad cars, but a better tonnage was produced last week than the week before. Prices are firmly maintained. The local demand is not heavy and most of the rail product is being pushed to the lake ports for shipment to the northwest. The control of the Monongahela River Consolidated Coal and Coke Company by the Pittsburg Coal Company will give the concern a firmer hold on the northwestern markets. By a deal now pending with the railroads the Pittsburg Coal Company will be assured of all the cars needed for its lake trade. The only formidable competitor in the Pittsburg district is the Pittsburg & Buffalo Company and this concern has entered into an agreement with the Pittsburg Company, extending over several years, to handle all of its lake trade.

Connellsville Coke.—Coke prices are a trifle lower this week. Standard Connellsville coke is quoted at $2@$2.25 for furnace and $2.75@$3 for foundry. The *Courier* in its last report gives the production for the previous week at 251,225 tons. The shipments totaled 10,810 cars, distributed as follows: To Pittsburg and river tipples, 4,224 cars; to points west of Pittsburg, 4,858 cars; to points east of Connellsville, 1,728 cars.

San Francisco. Sept. 17.

(From Our Special Correspondent.)

The local coal market is still quiet with no changes of importance in prices. The yard prices per ton to dealers are as follows for Pacific coast coals: Roslyn, $7; Wellington, $8; Seattle, $6.50; New Wellington, $8; Beaver Hill, $5.50; Coos Bay, $5.50; Bryant, $6.50; White ash, $5.25; Richmond, $7.50.

Cargo lots of eastern and foreign coals are quoted per ton as follows: Wallsend, $7.50; Brymbo, $7.50; Pennsylvania, hard, $14; Cumberland, $13; Cannel, $8.50; Welsh anthracite, $13; Castle Gate, $8.50; Clear Creek, $8.50; Rock Springs, $8.50; Colorado anthracite, $14; Sunnyside, $8.50.

Foreign Coal Trade. Sept. 12.

Messrs. Hull, Blyth & Co., of London and Cardiff, report that the Welsh coal market remains quiet and unchanged. Prices are, if anything, a shade weaker. Current quotations are: Best Welsh steam coal, $3.84@$3.90; seconds, $3.72; thirds, $3.60; dry coals, $3.36; best Monmouthshire semi-bituminous, $3.36; seconds, $3.24; best small steam coal, $2.04; seconds, $1.92; other sorts, $1.80.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market continues quiet and unchanged. Some rates are: Marseilles, $1.20; Genoa, $1.20; Naples, $1.20; Las Palmas, $1.44; St. Vincent, $1.06; Rio Janeiro, $2.40; Santos, $2.76; Buenos Ayres, $2.16.

IRON TRADE REVIEW.

NEW YORK, Sept. 23.

The general impression among buyers seems to be that there is a possibility of lower prices, not only for pig iron, but for most finished products. Therefore though buying of late has shown a slight improvement it has been largely of the hand-to-mouth order, consumers taking just enough to keep their plants supplied against current orders. As a time of advancing prices is a time of heavy buying, so a period of falling prices is accompanied by light buying—buying is apt to be light even after prices are plainly down to bottom figures. The present period market declines will doubtless not differ from others in this respect. Consequently in spite of the continued favorable outlook in most lines of industrial activity it may be some time before heavy buying starts.

The movement of ore down the lakes is coming to an end early, owing to the strike of the masters and pilots of the Pittsburg Steamship Company, controlled by the United States Steel Corporation.

Sales of pig iron show little improvement and there are reports of further cuts in foundry iron prices in the middle west. At Pittsburg bessemer pig has sold at $15.50, Valley furnace, the lowest price in two years. Prices of steel billets are still held at $27, and while there are reports of prices being shaded there is nothing to show that any serious break in prices is impending. The price of rails remains unchanged. Bar iron prices have fallen again.

Chicago. Sept. 21.

(From Our Special Correspondent.)

Sales of pig iron are somewhat better than last week, but they are not large enough yet to warrant the prediction that any significant change has come over the market. There is material for hope in the fact that the general condition is not worse, considering the pessimism among agents last week. The fluctuations of the market now, however, are exaggerated by both sides; ordinarily such changes as occur would not be considered at all significant. The most that can be said in strict truthfulness is that the market is dull—deadly dull—and that any real betterment apparently will come from curtailment of production by the furnaces.

The policy of small orders for delivery as soon as possible is adhered to by buyers. Southern brings $15.85@$16.25, Chicago, for No. 2, and Northern about $1 more than Southern for corresponding grades, as last week. Coke is somewhat firmer, there being no more on track than is needed, and is quoted at $5.80@$6 for first-class foundry.

Cleveland. Sept. 22.

(From Our Special Correspondent.)

Iron Ore.—There will be a stop to the shipment of ore down the lakes because of difficulties between the managers of the Pittsburg Steamship Company and the officials of the American Association of Masters and Pilots. It is a fight for the recognition of the union and the settling of some old scores by the mates' association. The 112 boats of the fleet are being sent to the dock and an effort to have the barges towed behind other ships may result in the refusal of the masters of those ships to haul the boats. The whole lake ore movement will end probably six weeks sooner than usual, resulting in the curtailment of the lake movement by 2,500,000 tons, bringing the season's aggregate down to about 25,000,000 tons. The ore on the docks and at the furnaces will suffice for the winter and until another season has opened. Nothing is being done in ore sales, the market being extremely quiet. The price holds nominally at $4.50 for bessemer old range and $4 for bessemer Mesabi.

Pig Iron.—The buying of foundry pig iron for immediate delivery is very light and the market is easy. The furnacemen have cut the price to compete with the independent Southern furnaces and No. 2 is quoted $15 in the Valleys. The non-association Southern stacks are quoting $11.50 and the association furnaces about $12, with some few selling at $11.75, Birmingham. The competition loses some of its force by reason of the light demand. Nothing is done in advance buying. The furnaces, however, are refusing to sell iron at prevailing prices for delivery after January 1. The inquiry for basic mentioned last week seems to have come from brokers who have no orders but are trying to get hold of a great deal of material anticipating an advance in price. Bessemer is off the market.

Finished Material.—The steel trade seems to be improving. The plate trade is again beginning to lead. A few new orders have been received, one of them amounting to 1,500 tons, and specifications against old contracts have been heavier. The whole market is in better shape with prices strong. Structural is also in better demand, a few sales being made and specifications being better. The price holds at 1.60c., Pittsburg. The jobbers are doing nothing. Bar iron is still weak, the effort to control the price being unavailing without taking the smaller mills into a pool. The price has sagged to a general quotation of 1.45c. at the mills, with some cutting to 1.40c. The steel situation is strong and 1.60c., Pittsburg, for bessemer is the bottom of the market. The sheet situation remains weak. The smaller mills have been cutting prices and the larger mills are more inclined to look favorably upon offers at reduced prices. In the association, however, the price has held firm. The steel men look upon the refusal to cut the billet prices as ominous to the small producer of sheets who is compelled to depend upon the open market for his supply of billets and sheet bars. The prices hold nominally upon the basis of 3.05c. out of stock for No. 27 black sheets and 4c. for No. 27 galvanized sheets. The billet market has been weak and nothing has been done by the association mills. Some of the outsiders have been selling a little material now and then. The market holds nominally at $27.50, Cleveland.

Old Material.—The market has been weak with prices sagging and with little or nothing being done. On what sales are presumed the jobbers are cutting prices savagely.

New York Sept. 23.

Pig Iron.—The local market continues quiet, with buying confined to immediate needs. We quote: No. 1X foundry, $17; No. 2X, $16.25@$16.50, while No. 2 plain can be had for 50c. less; gray forge, $15.25. For Southern iron, on dock, quotations are: No. 1 foundry $16; No. 2, $15.25; No. 3, $14.75.

Bar Iron and Steel.—Prices for large lots on dock are: Refined bars, 1.65@1.70c.; soft steel bars. 1.70@1.80c.

Plates.—There has been no change in local prices in spite of shaded quotations in the West. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.85c.; flange, 1.90@2c.; marine, 2.05@2.10c.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight. Relaying rails are $28@$33 for heavy sections and $33@$38 for light sections.

Structural Material.—Demand shows signs of improvement. Some large contracts are pending and will be closed before long. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees.

Philadelphia. Sept. 23.

(From Our Special Correspondent.)

The pig iron situation has apparently taken a turn for the better, though most of the business traced up here this week is of a hand-to-mouth nature. Brokers complain of the hesitating and halting policy of buyers, and are surprised that buyers do not contract far ahead, but leading buyers say to-day that they are not quite satisfied that the right time for heavy buying has come. Some of them are even hoping for some relief from abroad. It is a question even when prices for pig iron strike rock-bottom whether there will be the old-time buying for far ahead. Consumers are noting the evidences of increasing production and think that consumptive requirements are not likely to grow as fast. Quotations may be fairly given at $17.50 for No. 1 X foundry; $16.50 for No. 2 X; $15 for No. 2 plain; $15 for standard gray forge; $15 for basic; $21.50 for low phosphorus.

Steel.—There is a feeling that steel billets will yet tumble to what buyers think proper prices, and some people believe that bessemer billets will reach $25. Some business has been done this week, but it is merely to keep a fair stock on hand.

Bars.—Refined iron has been shaded within a few days. Just how much no one knows. It is supposed to be selling at 1.60c. Mill men have been offering common iron at a tenth under the lowest figures that were quoted during the summer. The only business done in steel bars has been in small lots at about 1.85@1.90c.

Sheets.—The impression has gone abroad that there is to be a general shading in sheets. This accounts for the trifling volume of business. No one seems to know where the root of the rumor is. Prices are weak and business is restricted.

Merchant Steel.—The demand has been altogether insignificant. We learn that some big business is being done in western Pennsylvania. The only business here has been in small lots. Some stuff for springs, carriage and wagon work and for ordinary machine shop work has been sold.

Pipes and Tubes.—The week has been dull but agents for pipes and tubes have been exceptionally busy all summer. The mills are well filled up and no efforts are made to secure trade.

Skelp Iron.—Only one order for skelp has been heard of this week.

Plate.—A few small lots of boiler plate is all that can be heard of in the way of business. A few additional orders are now under consideration for tank purposes. The manufacturers are not concerned at the present dullness and say that they have reasons for the assurance that their capacity will be sold up to the end of the year out of the business in sight. Ship builders are not buying anything.

Structural Material.—If intimations are to be relied upon the structural mills will very soon have a rush of business. Few orders have been closed here, but it is known that some very heavy transactions have been closed with the mills direct.

Steel Rails.—The only rails that are selling are light sections including an additional lot of girders.

Old Rails.—Old iron rails are $19 and old steel rails $16.

Scrap.—The scrap market is flat and dull.

Pittsburg. Sept. 22.

(*From Our Special Correspondent.*)

The reports of the pig iron market this week are rather conflicting, but there can be no dispute as to the fact that the lowest point for bessemer in two years has been reached. According to reports probably 10,000 tons of bessemer were sold during the week. The Bessemer Furnace Association is still holding this grade at $17, Valley furnaces, but no sales are reported at that figure. A leading outside interest announces sales for the week aggregating 5,000 tons at $16.50, Valley; while it is known that one lot of 500 tons for immediate shipment was sold at $15.50, and that several odd lots brought that price. Some interests take a discouraging view of the situation, while others are confident that the market will brighten soon. No one is buying iron except for immediate use and there is no contracting for iron for future delivery. One peculiar feature of the market is that low prices are only quoted for prompt shipment. Foundry No. 2 has taken a serious drop, sales having been made this week as low as $15.25, Pittsburg. A few car load lots brought from 25 to 50c. more. The foundries, however, are pretty well supplied and despite the small tonnage being taken all seem to have plenty of business on the books and none are idle. There is no market at all for gray forge. While the United States Steel Corporation has not yet closed a contract for fourth quarter bessemer, the report that negotiations are pending does not seem to be entirely without foundation. Buying may be deferred until next month. It is said that arrangements are being made to produce low phosphorus iron at a number of furnaces as it can be made at about the same cost as bessemer and commands a higher price. If this is done it will necessitate the buying of more outside bessemer iron.

The billet pool at its meeting on Thursday decided to continue the price of $27 for bessemer billets, and as a result the number of inquiries has increased. There are reports that the pool price is being shaded but it appears the low rate can only be had at certain delivered points. While there has been no recent orders for steel rails, the outlook is very promising and no cut in the established price of $28 is probable. It is estimated that the railmakers have on their books orders for over 1,500,000 tons including orders for delivery the rest of the year, the tonnage that will go over into next year and the new business taken when the price was renewed for 1904. As this is more than one-half of the annual capacity of the mills a lower price for further business is not considered likely. There is a slight improvement in finished steel products and prices are firm. Inquiries are better and some new orders have been placed. The mills are not particularly crowded with business, but have enough to keep them going the rest of the year. The only weakness noticed is in iron bars, sales having been made this week as low as 1.50c., Pittsburg, and as low as 1.45c. can be done at western mills.

The Amalgamated Association of Iron, Steel and Tin Workers is having considerable trouble among the members and every effort is being made to prevent a dissolution. Several lodges have refused to pay any more dues into the organization, including Iron City Lodge No. 1, the oldest and most influential lodge in the association. Announcement is made that a special convention has been secretly called and will be held some time this week. A strike was ordered at the Continental works of the National Tube Company in this city as that concern refused to sign the Amalgamated scale. The plant started non-union, several finishing mills now being in operation. The National Tube Company is a subsidiary concern of the United States Steel Corporation and this led to the report that the special convention would consider the advisability of ordering another general strike against the corporation. There are no grounds whatever for the report. It is possible that the convention may take up the matter of declaring all mills open to Amalgamated members and remove the limit of production on sheets. This would materially benefit the independent sheet mills, most of which employ union men when running.

Pig Iron.—If all reports are true nearly 10,000 tons of bessemer pig iron were sold during the week at prices ranging from $15.50 to $16.50, Valley furnaces. Foundry No. 2 is quoted at $15.25@$15.75, Pittsburg, and several thousand tons were sold. There is no market for gray forge, but the last sale was made at $14.75, Pittsburg.

Steel.—The number of inquiries for bessemer steel billets is increasing, evidently due to the re-affirming of the price of $27 by the billet pool. Some shading from this price is reported, but does not seem to have much effect on the market. Steel bars and plates remain firm at 1.60c.

Sheets.—The sheet market seems to be a little more active but most of the independent mills are idle. The situation, however, is considered decidedly better than a week ago. No. 28 gauge black sheets are held at 2.75c. and galvanized at 3.85c.

Ferro-manganese.—The price of domestic 80 per cent has dropped to $48 and the market is not as strong as a week ago.

BY TELEGRAPH.

A movement to curtail the output of pig iron by closing the valley furnaces on October 1 has made progress and it is now stated that details are practically completed.

Cartagena, Spain. Sept. 5.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Freights remain high, notwithstanding several cargoes have been shipped during the week. The general aspect of the iron market is, however, very dull, though there are some inquiries for forward delivery, but at prices which give little encouragement to sell. Exports were 8,150 tons manganiferous ores, and 7,500 tons iron ore.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosporus; 8s. 9d. for special iron ore; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites 40 per cent iron and 43 per cent sulphur are quoted at 10s. 6d. per ton, f. o. b., Cartagena. Exports 470 tons to Genoa.

CHEMICALS AND MINERALS.

(See also Prices-Current, page 492.)

New York, Sept. 24.

Consumers are falling in line and, for such articles as alkali, caustic soda and chlorate of potash, have placed large contracts for 1904 delivery. Eventually manufacturers of other chemicals will also be booking orders, and with few exceptions prices will be firmer than they have been. Raw materials are particularly strong just now, owing to the peculiar statistical position in the primary markets and the scarcity of supplies in the consuming territory. This must reflect on the manufacturing industries.

Enterprising Americans, who appreciate the aggravating position of consumers of sulphur in having to pay tribute to the extravagant policy of a foreign combination, are making plans for an independent supply of this important raw material. Already they have made the first payment on the Popocatepetl volcano in Mexico, which contains an almost inexhaustible quantity of sulphur, and, it is understood, are completing arrangements for working the Alaskan deposits and shipping the mineral to this country. At the same time energetic operations are being carried on at the Louisiana sulphur mines. The United States is the largest consumer of sulphur in the world, using annually about 525,000 long tons, of which, say, 185,000 tons, or 35 per cent, are supplied by foreign brimstone mines, particularly in Sicily, and the balance, of 340,000 tons, is recovered from sulphide ores, especially from imported and domestic iron and copper pyrites.

While brimstone deposits are attracting so much attention and the California nitrate beds are being prospected, the Chilean Government is energetically advertising for bids for new nitrate land, which it will offer for sale at auction at Santiago on November 20. There are 18 plots of mineral-bearing land in Tarapaca, having an estimated minimum value of $4,295,058.55 (gold), and 3 plots, valued at $2,433,924.40; making a total of 21 plots with a net value of $6,728,982.95, which are mostly well situated near water transportation and contain a variable quantity of good grade nitrate of soda. Doubtless some of this land will be acquired by the older oficinas, whose mines are nearly worked out. On the other hand, whoever purchases the various plots offered for sale will have to be considered by the nitrate producers' combination when it readjusts the quotas of its members. This may cause some inconvenience, although the reduction in the respective quotas will be lessened by the increased consumption of nitrate of soda throughout the world.

The powder combination is slowly crystallizing, and the latest news is that negotiations are pending for the control of the International Smokeless Powder and Chemical Company, which was formed in 1898 ostensibly to manufacture smokeless powder under contract to the United States Government. The net earnings of the company last year were $177,412, and the dividends paid $118,066, leaving undivided profits of $59,345. The total capitalization is $10,000,000, and a Philadelphia firm owns about 51 per cent of the stock.

The cement industry is expanding, not only in the United States, but also in Canada, where at least 11 new companies are erecting modern Portland cement plants having a daily capacity of 500 to 10,000 bbls. Americans are interested in some of the new Canadian works, and it is believed that the output in the Dominion this year will largely exceed the 550,000 bbls. reported in 1902.

Cyanide.—The shipments of the British article to the United States and Mexico seem to be increasing. Recently 15 tons of potassium cyanide were exported from Liverpool to Galveston, Tex.; the average invoice f. o. b. price was equivalent to about 17.7c. per lb. Simultaneously there was a shipment of 10 cases sodium cyanide from London to New Orleans at an average f. o. b. price of 18.7c. per lb. The New York market remains practically unchanged on the basis of 20c. per lb.

Bleaching Powder.—Now it is reported manufacturers will not fix contract prices until next month—that is, for public information; but this does not prevent them from making confidential terms with large consumers. Momentarily Continental bleaching powder is selling ex-dock at 85c.@$1.00 per 100 lbs., while Liverpool brands bring $1.10@$1.12½. Domestic is quoted at 87½c.@$1.00, f. o. b. works. The reason why Continental bleach is selling on spot at less than the domestic is that importers are unwilling to carry stocks and pay storage fees.

Copper Sulphate.—Jobbers are underselling makers. The former quote $4.75 per 100 lbs., and the latter $4.85@$4.87½ f. o. b. works. It is interesting to note that Mexico has been an active buyer. Recently a cargo of 85 tons, valued at £1,653 (say $4.22 per 100 lbs.) f. o. b. Liverpool was shipped to Tampico, Mex. There has also been a shipment of 15,000 lbs. from San Francisco to Curacao. Exports from Great Britain to all countries in August amounted to 1,297 tons, making a total of 49,281 tons since January, as against 39,333 tons in the same 8 months last year.

Chlorate of Potash.—Contracts for 1904 are being placed at a discount from regular prices, and some have been taken on the basis of 6½@6¾c. per lb., while the spot market is quoted at 7@7½c.

Acids.—Oxalic acid has strengthened. Most other commercial acids are quiet and unchanged in price.

We quote, as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l	$5.25@$5.50
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14 50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—There is so little brimstone on spot that practically nothing is being done in it. For next month's arrivals, however, importers ask $23@$23.25 per ton, while for future shipments $22.25@$22.50 is quoted for best unmixed seconds. Best thirds are about $1.25 less than seconds.

Imports of brimstone into Great Britain in August were 863 tons, making a total of 13,903 tons since January, which compares with 16,565 tons in the corresponding 8 months last year; showing a decrease of 2,662 tons.

Pyrites.—Trade is seasonably good, and prices are generally firm.

The imports of pyrites into Great Britain in August and the 8 months ending August 31 were as follows, comparison being made with the corresponding 8 months in 1902; the figures are in long tons:

	August,	Eight months.	
	1903.	1903.	1902.
Pyrites	61,293	521,139	418,164
Sulphur content	28,808	244,935	196,537

The increase this year is equivalent to 24.6 per cent, or 102,975 tons. We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines delivered at Atlantic ports.

Nitrate of Soda.—The continued scarcity of spot supplies and the expected limitation of futures, coupled with an increasing consumption, has caused more strength in this market. Spot prices at New York are quoted on the basis of $2.25 per 100 lbs., nearby arrivals $2.10@$2.15, and shipments at $2.05. The scheduled arrivals for October number seven, with an aggregate cargo of 31,600 tons.

The statistical position of nitrate of soda in Europe in the eight months ending August 31 is reported as follows, in long tons, comparison being made with the corresponding period last year:

Europe.	1902.	1903.	Changes.
Exports from So. America to..	630,944	609,424	D. 21,520
Imports	771,670	739,250	D. 32,420
Deliveries	857,620	939,740	I. 82,120
Loading, Sept. 1, for	104,221	82,373	D. 21,848
Visible supply, Sept. 1	364,500	319,310	D. 45,190

Notable changes this year were an increase of 9.6 per cent in deliveries, and a decrease of 12.4 per cent in the visible supply on September 1. It is also interesting to mention that the deliveries in August (42,000 tons) show a heavy falling off as compared with previous months this year, while the visible supply on September 1 was much larger than the four preceding months.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write us under date of July 11 as follows: On July 7 the Association Salitrera decided to increase the exports for the nitrate year ending March 31, 1904, to 32,500,000, which is considered excessive, as the actual exports are calculated not to exceed 32,000,000. Most producers have not been willing to operate except at higher prices than those quoted in our last report, and in the past few days a fair demand has set in. Several parcels of 95 per cent have changed hands for July at 6s. 6d.@6s. 6¾d.; August, 6s. 7d.; September, 6s. 7¼d.; December, 6s. 6½d.; January-March, 6s. 5½d.; and 96 per cent has sold at 6s. 8½d.@6s. 9½d. for August; 6s. 10d., October; 6s. 8½d., December, all alongside terms. The exports for the first six months this year amount to 12,113,000 qtls., against 13,056,000 qtls. during same period in 1902. We quote 95 per cent, July, 6s. 6½d.; August-November, 6s. 7d.; December, 6s. 6½d.; January-March, 6s. 5d.@6s. 5½d., all ordinary terms sellers; and 96 per cent, 6s. 9d.@6s. 9½d., any delivery, nominal. The price of 6s. 6½d. with an all-round freight of 18s. 9d. stands in 8s. 6¾d. per cwt., net cost and freight without purchasing commission. Reported sales for the fortnight were 546,000 qtls., and re-sales 44,000 qtls.

Sulphate of Ammonia.—Orders are so small that the trade looks very quiet. Good gas liquor can be had on spot at $3.07½@$3.10 per 100 lbs., while shipments are quoted at $3.02½@$3.05.

Phosphates.—The market shows sign of awakening from its late lethargic condition, and inquiries from superphosphate manufacturers are more frequent. In only a comparatively few instances are prices shaded to please consumers, as most miners believe a higher market will rule in the future.

In mining centers the weather is such as to permit active working, but stocks are not accumulating fast, as shipments of late have been very heavy. In Tennessee new discoveries of good rock are reported on Moseley's farm, near Wartrace, and on Nix's farm, in the fourth district, near Kelso.

Phosphates.	Per ton f. o. b	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@85%)..	$7.00@$7.50	6¼@7¾d.	$10.53@11.70
*Fla. land peb. (68@75%)..	3.50@3.75	5 9-16@5¾d.	7.70@8.05
+Tenn. (78@78.5%) export...	4.00@4.25	6½@7d.	10.40@11.20
+Tenn. 78% domestic.....	3.75@4.00	.....	.....
+Tenn. 75% domestic.....	3.50	.....	.....
+Tenn. 73@74% domestic..	2.95@3.20	.....	.....
+Tenn. 70@72% domestic..	2.70@2.95	.....	.....
‡So. Car. land rock.....	....@3.25	.....	.....
‡So. Car. riv. rk. (55@65%).	2.75@3.00	4⅝ 5½d.	5.90@6.60
Algerian (68@70%)	.....	5½@5¾d.	7.37@8.38
Algerian (58@65%)	.....	4⅝@5⅝d.	5.52@6.90
Gafsa (Tunis).....	.....	5¼@6d.	6.30@7.20
Christmas Isl. (80@85%).....	.....	7½@8¼d.	12.38@14.61

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Sept. 9.

(Special Report of Joseph P. Brunner & Co.)

Trade in heavy chemicals is rather quiet at present, the export demand being only moderate.

Shipments for August have been lighter than for some months past, although, when compared with the corresponding month of last year, sodas show an increase, while bleaching materials for America are less. Following are particulars of the exports for the month as taken from the Board of Trade returns just issued: Bleaching materials to United States, 52,486 cwt.; other countries, 26,029; total, 78,515 cwt. Soda ash, 100,163 cwt.; caustic soda, 100,937 cwt.; bicarbonate soda, 33,232 cwt.; soda crystals, 20,967 cwt.; saltcake, 68,189 cwt.; other sorts, 24,885 cwt.; total, 348,373 cwt.

Soda Ash is well controlled by makers at the usual range as to destination. For tierces the nearest values are about as follows: Leblanc ash, 48 per cent, £5@£5 10s.; 58 per cent £5 10s.@£6 per ton net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s; 58 per cent, £4 10s.@£4 15s. per ton net cash. Bags, 5s. per ton under price for tierces.

Soda Crystals are in steady request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for a few favored markets.

Caustic Soda is rather quiet, but supplies are only moderate and prices are firm as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton net cash. Special quotations for export to the Continent and a few other export quarters.

Bleaching Powder is without improvement as regards spot demand, and for hardwood £3 10s.@£4 per ton is about the nominal range, as to market.

Chlorate of Potash is dull at 2¾d@2⅞d. per lb. net cash, for English make.

Bicarb. Soda is in fair demand at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowance for larger packages, also special terms for a few favored markets.

Sulphate of Ammonia is quoted at £12 8s. 9d.@£12 12s. 6d. per ton, less 2½ per cent for good gray, 24@25 per cent in double bags f. o. b. here, but there is not much business passing.

Nitrate of Soda is in strong hands, and on spot and is still held for £10@£10 10s. per ton, for double bags f. o. b. here, the higher figure for best refined, which is scarce.

METAL MARKET.

New York, Sept. 23.

Gold and Silver Exports and Imports,

At all United States Ports in August and Year.

	August.		Year.	
Metal	1902.	1903.	1902.	1903.
Gold:				
Exports	$2,305,714	$84,776	$30,468,290	$40,538,775
Imports	5,143,597	7,808,807	19,925,362	26,416,068
Excess	I. $2,837 883	I. $7.724,031	E.$10,540,928	E. 14,122,707
Silver:				
Exports	4,744,898	2,019,655	30,944,737	22,540,420
Imports	1,807,219	2,319,076	16,304,439	14,864,587
Excess	E. $2,937,669	I. $299,021	E.$14,640,299	$7,675,833

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending September 23, and for the years from January 1

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week..	$4,000	$90,481	$433,873	$16,730	E. $330,662
1903....	31,416 903	6,321,731	21,662,787	2,938,838	E. 43,822,322
1902....	21,590,118	1,813,312	18,731, 43	921,218	E. 40,513,521
1901....	25,808,029	2,621,293	24,555,926	2,828,982	E. 43,915,667

The above statement has been revised with figures furnished by the Bureau of Statistics, Treasury Department, New York, and includes Mexican and foreign silver in coin or bullion.

General business is assuming a better aspect, and preparations are being made for an active fall trade. The speculative markets are quiet and depressed, owing to liquidation in the more important industrial securities.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending September 19, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$865,949,200	$987,534,400	$922,055,800
Deposits	930,361,900	888,871,000	909,482,300
Circulation	31,098,300	34,761,300	45,366,900
Specie	175,401,800	150,007,200	169,391,900
Legal tenders	70,842,900	70,568,500	71,152,300
Total reserve	$346,244,700	$220,575,700	$240,544,200
Legal requirements	232,590,475	222,217,750	227,370,575
Balance surplus	$13,654,225	*$1,642,050	$13,173,625

*Deficit.

Changes for the week, this year, were an increase of $568,100 in circulation, and decreases of $4,527,000 in loans and discounts. $8,713,300 in deposits, $2,676,300 in specie, $1,700,000 in legal tenders, and $2,198,575 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902.		1903.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Assoc..	$150,007,200	.....	$169,391,900	.....
England	188,116,960	.....	171,570.365	.....
France	520,415.845	$223.177,005	503,328,170	$223,289,175
Germany	175,510,000	64,915,000	176,080,000	62,080,000
Spain	71,255.000	97,185.000	73,225.000	100,240,000
Neth'lands	23.709,000	32,727,500	19,755,500	32,026,500
Belgium	15,703,335	7,851.665	14,430,000	7,215,000
Italy	80,310,000	10,324,000	96,720,000	11,468,000
Rusia	363,535.000	41,840,000	416,875.000	41,375,000
Austria	228,925,000	62.005.000	227,375,000	63,810,000

The returns of the Associated Banks of New York are of date September 19 and the others September 17, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has shown sudden strength in the London market. This is supposed to be on account of purchases for the Indian treasury, the reserves having fallen lower than normal.

The United States Assay Office in New York reports receipts of 100,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to September 10 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£4,448,810	£4,094,475	D. £354,335
China	149,550	294,186	I. 144,636
Straits	254,120	721,879	I. 467,759
Total	£4,852,480	£5,110,540	I. £258,060

Receipts for the week were £147,000 in bar silver from New York, £4,000 from the West Indies, and £8,000 from Australia; total, £159,000. Shipments were £99,750 in bar silver to Bombay, and £5,000 to Madras; total, £104,750.

The foreign trade of Great Britain in the eight months ending August 31 is valued by the Board of Trade returns as below:

	1902.	1903.
Imports	£347,172,166	£348,819,362
Exports	230,256,581	241,631,352
Excess imports	£116,915,585	£107,188,010

This shows an increase of £1,647,196 in imports and £11,374,771 in exports, and a resulting decrease of £9,727,575 in the excess of imports.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.45	$0.47
Peruvian soles and Chinese pesos	.42	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	4.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

September	Sterling Exchange.	Silver N. Y. Cts.	Silver London, Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter N. Y., Cts. per lb.	Spelter St. Louis, Cts. per lb.
17	4.85⅞	57⅜	26½	13¼ @13⅜	13⅛ @13¼	56⅜	27	4 35 @4.40	5.675	5.50
18	4.86⅛	57¼	26⅞	13¼ @13⅜	13¼ @13¼	56½	27	4.35 @4.40	5.675	5.50
19	4.86⅛	57⅜	26½	13¼ @13⅜	13⅛ @13¼	....	27	4.35 @4.40	5.675	5.50
21	4.86⅛	59	27¼	13¼ @13⅜	13 @13¼	56¼	23⅞ @ 26¾	4.35 @4.40	5.675	5.50
22	4.86¼	58⅞	27 3/16	13¼ @13⅜	13 @13¼	56	26⅞ @ 26⅞	4.33 @4.40	5.675	5.50
23	4.86¼	59	27 1/16	13¼ @13⅜	13 @13¼	55⅜	26¾ @	4.35 @4.40	5.675	5.50

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—The market throughout the week has been dull and uninteresting and the few orders which presented themselves were eagerly competed for. It is reported, however, that consumers are rather poorly supplied and a more active market is looked for in the near future. The closing quotations are 13¼@13⅜c. for lake; 13@13¼c. for electrolytic in cakes, wirebars or ingots; 12¾@13c. for cathodes; 12⅜@12⅝c. for casting.

The market for standard copper in London, which last week closed at £56 10s., opened on Monday at £56 5s., but on Wednesday declined very sharply, and the closing quotations are cabled as £55 5s.@£55 7s. 6d. for spot, and the same price for three months' prompt, so that the backwardation has entirely disappeared. Refined and manufactured sorts we quote: English tough, £61@£61 10s.; best selected, £61 10s.@£62; strong sheets, £69@£70; India sheets, £66@£67; yellow metal, 6⅛@6¼d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of September 22 and for the year to date, were in long tons:

	Week.	Year.
Austria	10	4,012
Belgium	20	1,057
France	446	14,916
Germany	1,710	19,967
Holland	800	28,278
Italy	50	2,001
United Kingdom	356	12,322
Other countries	281	4,344
Total copper	3,673	86,897
Matte	...	286
Imports—		
Copper	337	19,166
Matte	...	984
Ore	3,043	32,505

The movement shows some improvement this week. The ore imported came from Tilt Cove.

Imports and exports of copper in all forms in Great Britain, for the eight months ending August 31, are reported as below, in long tons; the totals giving approximate contents in fine copper:

Imports.	1902.	1903.	Changes.
Copper ore	64,008	58,366	D. 5,642
Matte and precipitate	48,577	49,208	I. 631
Fine copper	68,896	41,123	D. 27,773
Total fine copper	99,585	71,563	D. 28,022
Exports	49,763	39,487	D. 10,276
Balance	49,822	32,076	D. 17,746

Of the imports this year, 336 tons ore, 3,339 tons matte and 13,894 tons fine copper were from the United States, against 634 tons ore, 11,474 tons matte and 34,975 tons fine copper in the corresponding period in 1902.

Tin has been fairly active throughout the week. Efforts are still being made to maintain values for September, which have been partly successful, owing to the fact that arrivals during this month have been rather small. Futures are neglected. We quote spot and September 26⅝@26¾c.; October, 26@26¼c.; November, 25¾@26c.

The foreign market, which last week closed at £120 12s. 6d., opened £1 lower on Monday, in spite of the fact that silver showed a substantial advance. This was followed by a further decline of £1 10s. on Tuesday, and the closing quotations on Wednesday are cabled as £118 7s. 6d.@£118 10s. for spot and £118 17s. 6d.@£119 for three months.

It will be noticed that in place of the backwardation for three months tin, which existed for a long time past, the latter description is now ruling at a premium of about 10s.

Imports of tin into Great Britain with re-exports of foreign metal for the eight months ending August 31 are reported as below, in long tons, of 2,240 lbs.:

	1902.	1903.	Changes.
Straits	17,522	17,171	D. 351
Australia	2,026	2,959	I. 933
Other countries	2,181	2,035	D. 146
Total imports	21,729	22,165	I. 436
Re-exports	15,438	14,240	D. 198
Net imports	6,291	7,925	I. 1,634

Re-exports were principally to America. The metal received from other countries is chiefly Bolivian tin.

Lead.—A fair business has been done at the higher prices established last week, and the market closes firm at 4.30@4.32½c., St. Louis, and 4.35@4.40c., New York.

The foreign market continues easy, Spanish lead being quoted £11 2s. 6d. and English, £11 5s.

Imports and exports of lead in Great Britain for the eight months ending August 31 were as below, in tons of 2,240 lbs.:

	1902.	1903.	Changes.
United States	38,000	25,727	D. 13,173
Spain	64,983	70,004	I. 5,021
Australia	38,184	41,139	I. 2,955
Other countries	11,387	15,346	I. 3,959
Total imports	153,454	152,216	D. 1,238
Exports	22,635	22,134	D. 501
Balance	130,819	130,082	D. 737

The lead credited to the United States is chiefly Mexican metal, refined here in bond.

Spanish Lead Market.—Messrs. Barrington & Holt write us from Cartagena under date of September 5 that the price of silver during the week has been 14.50 reales per oz. The exchange has gone up 5 centimos to 34.65 pesetas to £. The local quotation for pig lead on wharf has been 62.75 reales per qtl., which on above exchanges is equivalent to £10 2s. 9d. per ton of 2,240 lb., f. o. b., Cartagena. Exports of pig lead were 269,500 kgs. to Marseilles, and 511,190 kgs. to Newcastle; a total of 780,690 kgs. Other exports were 1,325 kgs. silver ingots to Marseilles.

Spelter has ruled dull throughout the week, without any special feature, both consumers and producers maintaining a waiting attitude. The ruling quotations for shipment from the West are 5.50c., St. Louis, and 5.67½c., New York.

The foreign market is firm, good ordinaries being quoted at £21 5s. and specials £21 10s.

Imports of spelter into Great Britain for the eight months ending August 31 were 55,096 long tons, as against 62,794 tons last year. Imports of zinc manufactures were 14,911 tons, as compared with 14,250 tons in 1902. Exports of spelter were 5,108 tons, as against 5,605 tons last year.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write us from Cartagena, under date of September 5, that little is doing in blende. Spelter being more lively, miners continue stocking hoping for better prices in the near future.

Antimony is dull and depressed. We quote: Cookson's, 7@7¼c.; Hallett's, 6¼@6⅝c.; U. S. Star, 6@6¼c.; Italian and French, 6@6⅛c.; Japanese, 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are $45@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 7s. 6d. per flask, with the same quotation asked by second hands.

Imports of quicksilver into Great Britain in the eight months ending August 31 were 2,533,551 lbs., as against 2,411,941 lbs. last year. Re-exports were 1,040,915 lbs., as compared with 1,128,227 lbs. in 1902.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1, 98% ingots	34@37c.
No. 2, 95% ingots	31@33c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10)	40c.
Ferro-Titanium (20@25 N. Y.)	55c.
Ferro-Tungsten (37%)	38c.
Magnesium, pure (N. Y.)	60c.
Magnesium	$2.75
Manganese Cop. (20% Mn)	32c.
Manganese Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	92c.

Variations in price depend on size of order.

Missouri Zinc Ore Markets. Sept. 19.

(From Our Special Correspondent.)

The highest price for zinc ore is still $40, notwithstanding that the assay basis has been lowered and is $34@$36 per ton of 60 per cent zinc. Lead has made another advance of 50c., selling all week at $56 per ton, a total gain in four weeks of $3.50. The heavier purchases of zinc the past week indicates that the price was lowered in order to secure as much as possible of the small reserve stock at as close a figure as possible before the advent of bad weather. Following are the shipments of zinc and lead concentrates from the various camps of the Joplin district for the week ending to-day, and the year's totals to date:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,796,930	324,380	$59,425
Webb City-Carterville	2,349,800	438,350	52,215
Galena-Empire	1,136,300	105,460	24,605
Duenweg	786,570	105,600	17,115
Alba-Neck	710,240	.....	13,495
Prosperity	255,990	203,690	10,310
Carthage	291,600	57,070	6,260
Granby	438,000	18,000	6,250
Aurora	350,900	.....	5,040
Oronogo	282,990	4,630	4,965
Carl Junction	198,810	.....	3,775
Cave Springs	140,830	17,840	3,105
Central City	140,930	12,020	2,660
Zincite	138,140	.....	2,555
Mitchell	65,910	4,130	1,205
Badger	43,380	.....	760
Rush, Ark.	39,400	.....	670
Diamond	35,490	.....	600
Totals	10,202,210	1,290,170	$215,100
38 weeks	360,786,390	41,890,650	$7,339,640

Zinc value, the week, $179,060; 38 weeks, $6,209,175; lead value, the week, $36,040; 38 weeks, $1,130,465.

Average Prices of Silver, per ounce Troy.

Month.	1903		1902.		1901.	
	London Pence.	N. Y., Cents.	London. Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.84	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	.....	.....	23.88	51.52	26.95	58.26
October	.....	.....	23.40	50.57	26.62	57.59
November	.....	.....	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quot is per standard ounce, .925 fine.

Average Prices of Copper.

Month.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.542	12.110	14.212	12.360	57.30	53.93
July	13 094	11.771	13.311	11.923	56.64	52.80
August	12.932	11.404	13.159	11.649	58.44	51.96
September	.....	11.480	.....	11.760	.....	52.68
October	.....	11.449	.....	11.722	.....	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.623	.....	11.887	.....	52 46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars: prices of cathodes are usually 0.25 cent lower.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1903.	1902.	1903.	1902.	1903.	1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.025	5 043	4.15
March	30.15	24.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.546	4.075	5.550	4.37
May	29.51	29.85	4 325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.37
August	28.29	28.23	4.075	4.075	5.725	5.44
September	.....	26.60	.....	4.075	.....	5.29
October	.....	27.07	.....	4.075	.....	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.08	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.980c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Alaska	Utah	..	Oct. 7	Oct. 24	.03
Albion	Utah	..	Sept. 23	Oct. 10	.04
Bullion	Nev.	..	Sept. 23	Oct. 14	.03
Caledonia	Nev.	55	Sept. 30	Oct. 21	.13
California	Utah	4	Sept. 28	Oct. 26	.05
Challenge Con.	Nev.	..	Sept. 13	Oct. 6	.10
Chilar Con.	Nev.	..	Oct. 9	....	.00½
Chollar	Nev.	..	Sept. 17	Oct. 8	.10
Crown Point	Nev.	..	Oct. 7	Oct. 28	.10
Julia Con.	Nev.	33	Oct. 6	Oct. 29	.03
Mexican	Nev.	..	Sept. 24	Oct. 15	.10
Old Evergreen	Utah	4	Sept. 30	Oct. 16	.03
Omaha Con.	Cal.	..	Oct. 10	....	.66⅔
Ophir	Nev.	..	Sept. 15	Oct. 5	.15
Potosi	Nev.	67	Sept. 14	Oct. 6	.10
Reamer Con.	Cal.	..	Oct. 5	....	.10
Silver Bell	Utah	7	Sept. 14	Sept. 30	.01
Silver Coin	Utah	..	Oct. 1	Oct. 8	.01
Swansea	Utah	..	Sept. 21	Oct. 8	.15
Union Con.	Nev.	..	Sept. 23	Oct. 12	.10
Utah Con.	Nev.	..	Oct. 8	Oct. 29	.10
White Pine	Nev.	..	Oct. 3	....	.05

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
*Bartolome de Medina, Mex.	Sept. 30	10.68	1,365	75,715
Carmen-Guanajuato, Mex.	Oct. 10	.12½	18,125	27,750
†Central Coal & Coke, com.	Oct. 15	1.50	76,875	551,250
†Central Coal & Coke, pf.	Oct. 15	1.25	23,437	796,872
†Crucible Steel, pf.	Sept. 29	1.75	437,500	5,250,000
†General Chem., pf.	Oct. 1	1.50	150,000	2,566,418
Grand Central, Utah.	Sept. 21	.10	25,000	807,250
*Pacific Coast Borax	Sept. 20	1.00	19,000	1,488,500
†Republic Iron & Steel, pf.	Oct. 1	1.75	358,345	6,053,476
Silver Hill, Nev.	Sept. 21	.05	9,000	28,800
†Sloss-Sheffield S. & I., pf.	Oct. 1	1.75	114,000	1,710,000
Wolverine, Mich.	Oct. 1	3.00	180,000	1,230,000

*Monthly. †Quarterly.

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Sept. 16 H.	Sept. 16 L.	Sept. 17 H.	Sept. 17 L.	Sept. 18 H.	Sept. 18 L.	Sept. 19 H.	Sept. 19 L.	Sept. 21 H.	Sept. 21 L.	Sept. 22 H.	Sept. 22 L.	Sales.
Alamo Mg. Co., Utah.	1	125,000					01⅜								1,000
Amalgamated c., Mont	100	1,538,879	44⅝	41⅜	45	43⅜	47¼	44¾	45⅝	41	45⅛	43¼	41¼	43⅜	130,722
Anaconda c., Mont.	25	1,200,000	77	76			76				75½	70½	72		2,500
Anaconda, Gold Colo.	2	1,000,000													
Best & Belcher, Nev.	3	100,000			1.70		1.68		1.85						500
Breece	25	200,000							20						100
Brunswick, Cal.	5	100,000													
Caledonia, Nev.	1	100,000			95										100
Challar, Nev.	2½	112,000			28	27	24	23			23				1,100
Confidence, Nev	3	24,000													
Con.Cal.&Va.,g.s.,Nev	2½	216,000							1.45				1.35		414
Cons. Imperial, Colo.	1	500,000	05½				06								1,000
Creede&Crip.Ck.Colo.	1	800,000			03										1,000
Crown Point, Nev.	2½	100,000							25						200
Elkton, g., Colo.	1	1,250,000					4								100
Eureka, Nev.	20	5,000	25										11		600
Gould & Curry, Nev.	1	108,000	30	29											700
Greene Con., c., Mex.	10	720,000	18⅜	18⅛	18¼	18⅛	18⅜	18⅛	18¼	18	18⅜	17¾	18⅛	18	5,500
Hale & Norcross, Nev	100	112,000	54				52								500
Horn Silver, Utah.	20	400,000													
Isabella, g., Colo.	1	2,500,000	13½		13⅝				13						1,000
Jack Pot, Colo.	1	1,250,000													
Justice, Nev.	2	100,000											09		100
Leadville Colo.	10	400,000			03										1,500
Little Chief, Colo.	50	200,000													
Mexican, Nev.	3	100,000							1.20	1.15	1.20				300
Mollie Gibson, Colo.	5	1,000,000									03½				1,300
Moon Anchor, Colo.	5	100,000									12				1,000
Occidental, Nev.	3	1,000,000					34								150
Ontario, Utah.	100	150,000	6.00												10
Ophir, Nev.	3	100,800	1.70		1.80	1.75	1.80						1.85		700
Overman, Nev.	2	115,200													
Pharmacist, Colo.	1	1,500,000							02½		02½				2,500
Portland, Colo.	1	3,000,000	1.25		1.30	1.28					1.30				500
Potosi, Nev.	1	112,000							24		24				600
Quicksilver, Cal.	100	50,000													
Quicksilver pf., Cal.	100	43,000													
Savage, Nev.	3	112,000			39								20		1,000
Small Hopes Colo.	20	250,000													
Sierra Nevada, Nev.	3	100,000													
†Silver Hill, Nev	1	100,000									70				200
Standard, Cal.	10	178,314													
Tenn., c., Tenn.	25	175,000	28	27½			28½	28⅜			27½				470
Union Con., Nev.	1	100,000									75				700
Union Cop., N. C.	25		1								1		⅞		3,700
Uni'd Cop. com., Mont	100	300,000			15½				15½				15½		300
White Kn'b, g. s., Id'o.	100	450,000					10						09⅝	09½	225

Total sales 163,429 shares. † Ex-Dividend.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Sept. 21 H.	Sept. 21 L.	Sept. 22. H.	Sept. 22. L.
Acacia	.03⅜	.03⅛	.03⅝	.03⅛
Am. Con.	.02	.01⅝	.02	.01⅝
Anaconda	.13½	.12½	.13½	.12½
Blue Bell	.05	.03	.05	.03
Cripple Creek Con	.04⅛	.03⅛	.04½	.03⅝
C. K. & N.	.19⅝	.18	.21	.18
Doctor Jack Pot	.09	.08½	.09	.08⅛
Elkton Con	.51	.50	.50½	.50
El Paso	.60	.59	.60	.59½
Findley	.14¼	.14	.14¼	.14
Gold Dollar Con.	.04⅜	.04⅛	.04¾	.04⅛
Golden Cycle	.07	.06	.07	.06
Golden Fleece	.20	.07	.20	.07
Gould	.02½	.02¼	.02½	.02

Name of Company.	Sept. 21. H.	Sept. 21. L.	Sept. 22. H.	Sept. 22. L.
Isabella	.11¼	.10¾	.12	.11
Jack Pot	.03	.02	.00	.01½
Keystone	.03¾	.03½	.03⅞	.03⅝
Last Dollar	.60	.25	.60	.25
Lexington	.03¾	.03½	.03⅝	.03½
Little Puck	.03	.02¾	.03	.02¾
Mollie Gibson	.05	.04¾	.05	.04¾
Moon Anchor	.13	.11¾	.12	.11½
Old Gold	.07¼	.07⅛	.07¼	.07⅛
Pharmacist	.03⅜	.03⅛	.03⅜	.03⅛
Pinnacle	.03	.02	.03	.02
Portland	1.25	1.15	1.25	.15
Vindicator	.85	.60	.85	.60
Work	.05¼	.05⅛	.05¼	.05

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	Sept 12 H.	Sept 12 L.	Sept. 14 H.	Sept. 14 L.	Sept. 15 H.	Sept. 15 L.	Sept. 16 H.	Sept. 16 L.	Sept. 17 H.	Sept. 17 L.	Sept. 18 H.	Sept. 18 L.	Sale
Acacia	$1	1,500,000	.07	.03	.07	.07⅛	.07⅛	.06	.07	.06	.07	.07⅛	.03⅞	.03	
Am. Con.	1	2,000,000	.01	.01¼	.02	.01½	.02	.01⅜	.02	.01⅜	.01	.01⅜	.02	.01½	2,100
Anaconda	5	1,000,000	.14	.12½	.14	.12½	.14	.12½	.14	.12½	.14	.12½	.14	.12½	
Ben Hur	1	800,000	.02		.02		.02		.02		.02½		.02		2,000
Blue Bell	1	1,000,000	.03		.03				.03		.03		.03		
C. C. & M.	1	1,000,000	.02¼		.02¼	.02⅛	.02⅛	.02¼	.02⅜	.02⅛	.02⅛	.02⅜	.02⅛	.02¼	1,000
C. K. & N.	1	1,250,000	.22	.18½	.20	.18	.20	.18	.19½	.18	.20	.18	.20	.18	1,000
C. C. Con.	1	2,000,000	.03⅞		.01⅝	.03⅜	.01⅝	.03⅜	.03⅝		.01⅝	.03⅜	.04½	.03⅜	
Coriolanus	1	1,500,000	.02		.02		.02		.02		.02		.02		2,300
Des Moines	1	750,000	.02⅜	.02⅜	.03	.02⅛	.02¼	.02¼	.02¼		.02¼		.02¼		500
Dr. Jack Pot	1		.08⅝	.03¼	.09	.08¼	.09	.04	.09	.08	.09	.09	.0 ½		1,000
Elkton Con	1	1,250,000	.47	.45	.45		.47¾	.47¼	.4 ¼	.45	.50	.45	.49	.47¾	7,000
El Paso	1	900,000	.60½	.59¾	.61	.60	.61	.60½	.59⅞	.60	.59½	.60	.59½	.59	5,500
Fannie Rawlings	1	1,000,000	.02	.01	.03	.02½	.03	.02	.03	.02½	.02	.02	.02½	.02	1,000
Findley	1	1,250,000	.14	.13½	.14	.13⅝	.14	.13⅝	.14	.13½	.14	.13¾	.14	.13¾	
Gold Bond	1	1,000,000	.01		.01		.01				.01⅜		.01⅜		
Gold Dollar Con.	1		.04⅜	.01⅜	.04⅜	.04¼	.04⅜	.04¼	.04¼	.04¼	.04⅜	.04¼	.04¼	.04¼	7,000
Golden Cycle	1	2,000,000	.07½	.07	.08	.07	.07		.08	.06	.07½	.06	.08	.07	1,000
Golden Fleece	1	600,000	.02½	.02⅜	.15	.07	.15	.07	.15		.15	.07	.20	.07	
Gould	1	1,250,000	.02⅜	.02	.02½	.01⅜	.02⅜		.02⅜		.02⅜	.02	.02⅜	.02	1,000
Hart	1	1,000,000	.02		.02		.02		.02		.02		.02		
Isabella	1	2,500,000	.11⅝	.11	.11¼	.10¾	.11¼	.11	.11¼	.13½	.11⅝	.10¾	.11¼	.10½	6,500
Jack Pot	1	1,250,000	.08⅜	.07⅝	.08¾	.07½	.03	.07	.08⅜	.07⅜	.07		.07		1,000
Last Dollar	1	1,500,000	.45		.50		4		.46	.25	.48		.46		
Lexington	1	1,500,000	.01⅝		.01⅝		.03⅝	.03½	.03¾	.03¼	.03¾	.01⅝	.03½		2,000
Little Puck	1	2,000,000	.03	.02	.03	.02	.03	.02	.03	.02	.03	.02¼	.03	.02½	
Mollie Gibson	1	1,000,000	.05		.05		.05		.05		.04½	.04	.04¼		5,000
Moon-Anchor	1	600,000	.10¾	.10	.12	.09⅝	.13	.10	.12	.09¾	.11⅝	.10⅜	.13	.10½	2,250
New Haven	1	1,500,000	.02½	.02¼	.02½	.02¼	.9 ⅜	.02¼	.02⅜	.02¼	.02½	.02¼	.02½	.02¼	
Pharmacist, Con	1	1,500,000	.03¼	.03¼	.04	.03⅝	.01⅜	.03⅛	.03⅜	.03¼	.03⅜	.03⅜	.01⅜		1,000
Pinnacle	1	2,000,000	.01		.03		.03¼		.03¼		.03		.03		
Pointer	1	1,250,000	.01		.01		.01		.01		.01		.01		
Portland	1	3,000,000	1.25	1.19	1.25	1.18	1.25	1.15	1.25	1.15	1.25	1.20	1.22	1.19	1,100
Prince Albert	1	3,000,000	.02½	.01⅜	.0 ¾	.01¾	02¼	.01½	.01⅝		.02¾	.01⅜	.02¼	.0 ⅝	
Vindicator	1	1,500,000	.90		.90		.85	.60	.85	.70	.85		.85	.60	
Work	1	1,500,000	.05⅞	.05½	.05½	.05¼	.0 ⅞	.05½	.05⅜	.05¼	.05½	.05⅜	.05⅜	.05¼	12,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 83,838 shares.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	September 21.	September 22.
Belcher	104,000	.25	.27
Best & Belcher	100,800	1.80	1.05
Caledonia	100,000	.88	.84
Challenge Con.	50,000	.32	.30
Chollar	112,000	.22	.21
Confidence	24,000	.80	.80
Con. Cal. & Va.	216,000	1.45	1.45
Con. Imperial	500,000	.04	.04
Crown Point	100,000	.14	.14
Gould & Curry	108,000	.28	.25
Hale & Norcross	112,000	.50	.51

Name of Company.	Shares Issued.	September 21.	September 22.
Justice	105,000	.09	.10
Mexican	100,800	1.00	1.07
Occidental Con	100,000	.33	.33
Ophir	100,800	1.75	1.70
Overman	115,200	.23	.22
Potosi	112,000	.22	.21
Savage	112,000	.24	.23
Sierra Nevada	100,000	.04	.02
Union Con	100,000	.74	.75
Utah Con	100,000	.13	.14
Yellow Jacket	120,000	.50	.48

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val.	Shares Issued.	Sept. 16 H.	Sept. 16 L.	Sept. 17 H.	Sept. 17 L.	Sept. 18 H.	Sept. 18 L.	Sept. 19 H.	Sept. 19 L.	Sept. 21 H.	Sept. 21 L.	Sept. 22 H.	Sept. 22 L.	Sales
Allis-Chalmers, U. S.	$100		11										11		300
Allis-Cham's, pf, U. S.	100	200,000													
Am. Agr. Chem., U. S.	100														
Am.Agr.Chem.pf,U.S.	100	181,350											77½		100
Am. Sm. & Ref., U. S.	100	500,000	43	42½	44	43	43¾	42¾	42	40¾	43	41⅛	42¾	42¼	23,970
Am.Sm. & Ref.,pf,U.S.	100	500,000	90⅝		90⅝	90¼	90¼	90	90		89¾	89¾	90	89½	2,035
Am. Steel & Fdy.,U.S.	100				10										100
Am. S. & Ldy., U. S.	100	155,000													
Col. Fuel & I., Colo.			43¼		43½		43	42½	42½	41⅞	42				1,645
Col. & H. C. & I., Colo.	100	69,244	13				14		14	13¼	13½				650
†Crucible Steel, U. S.	100	250,000	9	7⅝	8⅜	07⅜	7⅝	6⅝	8	7	08	07½	08	07¾	13,770
†CrucibleSteel,pf,U.S.	100	250,000	69¼	68⅞	69	67¼	67	61¼	62½	61½	63	62¾	63	62⅜	5,817
†Mong. R. Coal, Pa.	50	200,000	10⅜		10								10	09¾	2,577
†Mong. R. Coal, pf, Pa.	50	98,300	37	35	38	35½	35		35						240
National Lead, U. S.	100	149,054			14¾				14		14		14		700
National Lead, pf,U.S.	100	149,040	83												600
†Phila. Nat. Gas.	100	398,542			38¾		38¾				38¾	38⅜	38¾	38	385
†Phila. Nat. Gas, pf.	100	212,873													
†Pittsburg Coal, Pa.	100	300,307	30½	30¼	30	29⅝	29⅜	29	29	28¾	29		28¾	28⅜	3,870
†Pitt'burg Coal,pf,Pa.	100	297,012	81½	81	80	79	78½	75½	76	75¾	78	77	77½	77⅜	1,498
Republic I. & S., U. S.	100	273,520	10½		10¼	9¼	9¾	9½	9¼	9¾	9¼	9	10⅞	09¾	5,250
Republic I.&S.,pf,U.S.	100	203,569	66	64½	65½	64	64¾	62¼	62⅝	62	62½	61½	65	62½	19,230
Sloss-Shef S. & I., Ala.	100	75,000	31		31		30½	29½	29	27	28½	28	28½		1,050
Sloss-Shef S.&I.pf,Ala.	100	65,085					70½	79	78						300
Standard Oil, U. S.	100	970,000	3.12		6.12		3.11	6.10	3.10	6.04	6.10	6.09			191
Penn. C. I. & R. R.	100	225,000	37½	33½	37½	33½	35½	33	34⅝	33⅜	34½	33½	35	34½	27,002
U.S. Red. & Ref., U. S.	100	59,188													
U.S.Red&Ref.,pf, U.S.	100	39,485													
‡U.S.Steel Corp., U. S.	100	5,084,952	19⅛	19⅛	19⅞	18¼	19⅛	18	18	17	18	16¾	18⅜	17⅝	345,138
U.S. SteelCrop.pf, U.S.	100	5,103,111	69¼	68	69⅜	68⅜	69¼	68¾	68⅜	67⅞	68⅜	67⅝	69	68	73,154
Va.-Car Chem., U. S.	100	279,814	23¼	23	23⅜	23	23¼	22¼	2.3¾	22	22¾	22⅜	22½	22	5,300
Va.-Car Chem.,pf,U.S.	100	120,000							96⅝				97	97	130
Va. I., Coal & Coke	100	85,416					19								100

‡Ex-dividend. Total sales 532,231 shares.

BOSTON, MASS.*

Name of Company.	Par val	Shares listed	Sept. 16 H.	Sept. 16 L.	Sept. 17 H.	Sept. 17 L.	Sept. 18 H.	Sept. 18 L.	Sept. 19 H.	Sept. 19 L.	Sept. 21 H.	Sept. 21 L.	Sept. 22 H.	Sept. 22 L.	Sales.
Adventure Con., c.	$25	100,000	5¼				5						5¼	5	375
Allouez	25	99,511	4¾		5	4½			5		5	4¾	4⅛	4¾	332
Amalgamated, c.	100	1,535,879	44⅜	43¼	45¼	44¼	46⅛	44⅜	45⅝	44¼	44⅞	43¾	44⅜	44	15,406
Am. Gold Dredging	5	90,000													
Am. Z. L. & Sm.	25	60,000													
Anaconda	25	1,200,000													
Arcadian, c.	25	150,000							1¼		1⅜		1⅜		150
Arnold	25	60,000							50						50
Atlantic, c.	25	100,000													70
Bingham Con., g. s.	50	150,000	23¾		24				23½	23	23¾	22½	22½	22	1,200
Bonanza	10	300,000									65		55		150
Breece	25	100,000													
British Columbia	5	256,800													
Cal. & Hela, c.	25	100,000	4.0		4.0						4.40				11
Centennial, c.	25	90,000	17½	16¾	18	17¼	18	17½	18	17½	17¾	17¼	17½	17	1,412
Central Oil	25	60,050									7¾	7	7		335
Con. Mercur, g.	5	1,000,000					1⅜		1⅜		1¼	1¼	1¼	1¼	2,550
Copper Range Con.	100	371,750	57	55	58½	56	58½	57	57	55	56¾	54¾	55½	54	28,701
†Daly-West,	20	180,000	40		40	39⅝	40	39½	39½		39¾	39			514
Dominion Coal	100	150,000	72½	72	72¾	71¾	71	69	70¾	70	70	68	72	69¼	2,870
Dominion Coal, pf.	100	30,000	108¾				109½	109			110	109	110		40
Dominion I. & S	100	100,000	11¼	11	11		11⅝	10½	10½		11	10¼	12¾	10½	1,530
Elm River	12	100,000	2¾		2¼		2¾								150
Franklin, c.	25	100,000			8¼	8⅛	8½	8¾							80
Franby Con.	10	1,338,303			4½	4					4		4		1,500
Guanajuato Con.	5	385,000	75		75						75				450
Isle Royal Con., c.	25	385,000							7		7				65
Mass Con., C.	25	100,000	5⅛	5					5¼				5		235
Mayflower, c.	25	60,000					75								500
Michigan, c.	25	100,000							7½		8				175
Mohawk, c.	25	100,000	41				40½		40¼		41	40	40¼	40½	595
Mont. Coal & Coke	25	200,000													
Mont'l & Boston, c.	5	570,000					1								5
New Idria	5	100,000													
Nova Scotia St. & C.	100	37,023													
Nova Scotia St.&C., pf.	100	10,300													
Old Colony, c.	25	100,000	1												200
Old Dominion, c.	25	150,000	9¼	9	9	8½	9	8½	8	8	8	7½	7½	7¼	8,345
Osceola, c.	25	96,150	58	57½	57		57½		56½		57	56½	56¾		355
Parrott, s. c.	10	229,850	19¼	19⅛							19¼	19			100
Phœnix Con, c.	25	100,000	5				5		5¼				5		115
Quincy, c.	25	100,000			90		90						90		20
Rhode Island, c.	25	100,000											1¼		50
Santa Fe, g. c.	10	250,000					1⅜								10
Shannon, c.	10	298,021	9¼						9½		10	9½			950
Tamarack, c.	25	60,000			87				90	85	90				57
Tecumseh	25	80,000													
Tennessee	25	175,000													
Trinity, c.	25	100,000	6⅛	6	6⅛	6¼	6⅛	6¼			6⅛	6⅛	6⅛	6	700
United c.	100	450,000													
United States, g.	10	300,000			19⅜	19	19⅜	19⅛	19		19¾	18¾	19	18¾	1,501
U. S. Coal & Oil	25	240,000			10½						10⅜	10	10¼		500
Utah Con., g.	25	100,000	25¼	25⅛	25⅞	25½	26⅛	25¼	25¼		25½		25⅞		680
Victoria	25	100,000					3¾								100
Winona, c.	25	100,000			7¼		7¾		7½	7⅜			7½	7¼	125
Wolverine, c.	25	60,000	64		65		66		66½				65½		60
Wyandot	25	100,000													

†Ex Dividend. ‡Assessment Paid. Total sales, 63,801 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Sept. 11 H.	Sept. 11 L.	Sept. 12. H.	Sept. 12. L.	Sept. 14. H.	Sept. 14. L.	Sept. 15 H.	Sept. 15 L.	Sept. 16 H.	Sept. 16 L.	Sept. 17 H.	Sept. 17 L.	Sales
Colehan	Nev.	$1,000,000													
Esperanza	Nev.	1,000,000	.04		.04		.04	.03	.03	.02	.03				44,500
Eul, Con. Mg. Co.	Nev.	750,000									.03				200
Gipsy Queen	Nev.	750,000					.26		.26		.26				600
Hannapah	Nev.	1,000,000													
MacNamara	Nev.	500,000					.17		.19		.17				800
Mizpah Ex. M. Co.	Nev.	1,000,000	.32		.32						.34				1,700
Mont-Tonopah	Nev.	1,000,000	1.00		.93		.96	.95	.95		.91	.90			2,300
New York Tonopah	Nev.	1,000,000													
Paymaster	Nev.	750,000	.14				.14	.13							500
Pine Grove G. M. Co.	Nev.	1,000,000									.54				600
Rescue	Nev.	1,000,000							.10		10				200
South Eureka M. Co.	Cal.	3,000,000													
Standard Mg.	Cal.	200,000													
Tonopah-Belmont	Nev.	2,000,000							1.60						100
Tonopah & Cal.	Nev.	2,000,000							.25		.25				400
Tonopah Midway	Nev.	750,000							.43						300
Tonopah Mg. Co.	Nev.	1,000,000													
Tonopah North Star	Nev.	750,000			.50	.49	.50	.47	.49	.46	.49	.43			7,000
Tonopah & Salt Lake	Nev.	300,000													
United Tonopah	Nev.	1,000,000													
Wildman & Mahony	Cal.	100,000							.75						100

Total sales 60,100 shares.

STOCK QUOTATIONS

MEXICO*. Sept. 11

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Ask.
Durango:				
Cs. Min. de Penoles	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos	2,400	5.00	112	113
Cinco Senores y An., aviadoras	2,000	15.00	165	170
Cinco Senores y An., aviada	400	10.00	160	165
Providencia, San Juan de la Luz	6,000	2.00	115	120
Queensland y Australia	300	.....	75	85
Guerrero:				
Delfina, 1st serie	2,500	.....	78	80
Delfina, 2nd serie	2,500	.....	25	30
Garduno y Anexas	7,200	.....	45	60
Hidalgo:				
Amistad y Condordia	9,000	8.87	87½	88
Carmen, aviada	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	180	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,533	.....	.....	.....
La Blanca, aviada	768	.....	.....	.....
La Reina y An., aviadora	5,000	.....	20	23
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,980	.....	140	160
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada	12,800	.....	7	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	10	13
Sta. Gertrudis y An., aviadora	28,800	1.00	88	89
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	18	20
San Felipe de Jesus, aviada	1,200	.....	8	10
San Rafael y An., Trompillo	1,200	12.00	1,750	1,800
San Rafael y An., aviada	1,200	4.00	750	770
Soledad, aviada	900	5.00	750	760
Sorpresa, aviada	900	5.00	428	435
Mexico:				
Alacran	2,400	.....	.....	60
Aldebarren	2,000	.....	125	130
Buen Despacho	3,000	.....	95	100
Dos Estrellas	3,000	30.00	3,180	3,200
La Esperanza (El Oro)	3,000	10.00	.....	1,500
La Reformia, aviadores	2,000	.....	85	90
Providencia, pagadoras	1,000	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan:				
Luz de Borda, aviadora	3,000	.....	165	170
Luz de Borda, aviado	1,000	.....	60	70
Nuevo Leon:				
La Fraternal	1,000	.....	550	600
Norias de Bajan	1,000	.....	800	850
Santiago y An., Tlal	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An	3,000	.....	85	95
El Barreno, aviadora	2,000	2.00	48	55
Sta. Maria de la Paz	2,400	20.00	685	695
San Diegoy Annexas	2,400	4.00	14	20
Zacatecas:				
Asturiana y An	2,500	.....	78	80
Candelaria y Pinos	2,500	10.00	190	200
Cubiertas	2,400	.....	.....	.....
Esperanza y An	2,400	.....	23	28
Lourdes	2,500	.....	23	23
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	95	100
Nueva Quebradilla, aviadas	600	.....	70	85
San Carlos y Annexas	2,500	20.00	150	160
Sta. Maria de Gaud	2,500	10.00	65	75
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca)	3,750	.....	.....	.....
La Reina (Chihuahua)	192	.....	.....	.....
Naica (Chihuahua)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,050	1,200
Natividad (Oaxaca) aviadas	600	4.00	.....	.....
San Francisco Hac	6,000	1.00	55	57
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	230

*Values are in Mexican currency.

TORONTO, ONT.* Sept. 19.

Name of Company.	Par val	Prices. High.	Low.	Sales.
Black Tail	$1	.04	.02	.....
Cariboo (Mc. K.)	1	.13	.....	.....
Cariboo (Hyd.)	1	.75	.....	.....
Center Star	1	.29	.22	.....
Crows Nest, C.	100	3.50	2.80	.....
Dominion Coal, com.	100	73.00	69.50	.....
Dominion S. & I.	100	.12	.10	.....
Fairview	1	.05	.03	.....
Giant	1	.03	.02	.....
Deer Trail	1	.02½	.01¼	.....
Iron Mask	1	.06	.....	.....
Morrison	1	.04	.02	.....
Granby Smelter	$10	4.50	3.90	.....
Mountain Lion	1	.28	.20	.....
North Star	1	.14	.03½	.....
Nova Scotia Steel, com	100	87.00	85.50	.....
Payne	1	.19	.16	.....
Rambler Cariboo	1	.40	.30	.....
Republic	1	.03	.01	.....
St. Eugene	1	.48	.40	.....
Virtue	1	.07	.05	.....
War Eagle Con	1	.14	.09½	.....
Sullivan	1	.06	.04	.....
Winnipeg	1	.04	.....	.....
Wonderful	1	.04	.....	.....

Total sales, 1,100

SALT LAKE CITY.* Sept. 19.

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	$10	300,000	.20½	.20½	500
Butler Liberal	.....	.....	.17	.16	3,625
Carisa	1	300,000	1.39	1.32½	7,800
Con. Mercur	5	1,000,000	1.90	1.80	3,150
Daly	20	150,000	9.00	8.87½	300
Daly-Judge	20	300,000	40.10	39.00	830
Daly-West	1	150,000	3.32½	3.32½	587
Grand Central	1	250,000	.32½	.32½	100
L. Mammoth	20	250,000	.75	.71	2,000
Little Chief	.....	.....	.18	.11¼	20,215
May Day	½	400,000	.11	.08½	80,100
M. Washington	½	300,000	.03½	.02	49,500
Mammoth	25	400,000	1.05	1.00	200
Naildriver	.....	.....	1.25	1.25	300
N. Y. Bonanza	.....	.....	.35½	.15½	28,500
Sacramento	1	.....	.28½	.28	1,150
Silver Shield	5	1,000,000	.15	.14¾	4,700
So. Swansea	1	300,000	.11¼	.10	3,400
Star Con	.....	.....	.....	.....	58,050
Swansea	.....	.....	.31½	.30	1,900
Tetro	1	500,000	.41	.31	39,300
Uncle Sam Con	.....	.....	.27½	.26	10,900
Utah	10	100,000	.71	.70	500
Victor Con	1	500,000	.13½	.12	6,400
Wabash	1	500,000	.16	.15½	3,900
Yankee Cons	1	500,000	.70	.58	8,400

*By our Special Correspondent. All mines are in Utah. Total sales, 337,913 shares.

PHILADELPHIA, PA *

Name and Location of Co.	Par val.	Sept. 16. H.	L.	Sept. 17 H.	L.	Sept. 18. H.	L.	Sept. 19. H	L.	Sept. 21. H.	L.	Sept. 22. H.	L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	.....	.....	7	.....	.....	.....	.....	.....	.....	.....	7	6⅞	311
Cambria Iron, Pa	50	.....	.....	.....	.....	45⅞	.....	.....	.....	.....	.....	.....	.....	50
Cambria S., Pa	50	20¼	20⅛	21	20⅛	20⅛	20⅛	20⅛	20	20⅛	20⅛	21	20⅛	4,886
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I. & S., Pa	5	¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
United Gas I. Pa	50	83½	83⅜	84	.....	85	84⅛	84½	83½	84	83⅝	84	.....	425
Warwick I. & S.	10	.....	.....	4¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,296
Diamond Steel	50	.....	.....	6⅛	.....	68	.....	.....	.....	.....	.....	.....	.....	55
Philadelphia	50	.....	.....	39½	39	39	.....	.....	.....	38¾	38⅛	39	38¼	2,444
U. S. Steel	100	20	19¼	19⅞	19⅝	19¼	18	18	17	18	17	18⅜	17⅝	39,398
U. S. Steel, pf	100	68¾	.....	69	.....	64¼	64¼	.....	.....	.....	.....	68¾	.....	700

Total sales 50,088

LONDON. Sept. 11

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Date.	Quotations. Buyers. £ s. d.	Sellers. £ s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	July, 1903	4 2 6	4 7 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	4 1 3	4 3 9
Arizona, c., Def., ord.	63,444	1 0 0	5 6	Aug., 1903	6 15 0	7 5 0
Arizona, pref., ord	316,350	1 0 0	5 6	Aug., 1903	7 0 0	7 5 0
Camp Bird, g., Colorado	738,000	1 0 0	.. 9	Sept. 1903	1 5 0	1 7 6
Central Chile, C., Chile	276,248	1 0 0	.. 6	Jan., 1902	3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	6 10	May, 1903	1 7 6	1 12 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	July, 1903	1 8 9	1 11 3
Frontino & Bolivia, g., Columbia	128,932	1 0 0	3 0	July, 1901	13 9	16 3
Le Roi, g., British Col.	200,000	5 0 0	5 0	Nov., 1899	12 6	15 0
Le Roi No. 2, g., British Col.	120,000	5 0 0	5 0	May, 1902	17 6	1 10 0
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	2 0	3 0
Montana, g. s., Montana	657,128	1 0 0	6	April 1899	1 9	2 3
Mountain, c., Cal.	250,000	5 0 0	2 4	May. 1903	2 17 6	3 2 6
Stratton's Independence, Colorado	1,000,037	1 0 0	1 0	Aug., 1903	6 0	7 0
St. John del Rey., g., Brazil	548,245	1 0 0	8	June, 1903	15 0	16 0
Utah Con., g. c. (Highland Boy), Utah	300,000	1 0 0	6 3	July, 1903	5 0 0	5 10 0
Ymir, g., British Col.	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European:						
Linares, l., Spain	15,000	3 0 0	1 0	Mar., 1903	2 5 0	2 15 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	11 0	May, 1903	3 10 0	3 15 0
Rio Tinto, c., Spain	325,000	5 0 0	27 6	May, 1903	48 7 6	48 12 6
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	May, 1903	6 2 6	6 7 6
Tharsis, c., Spain	625,000	2 0 0	6 0	May, 1903	4 0 0	4 5 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,388	1 0 0	2 0	July, 1903	1 17 6	2 0 0
Briseis, Tm. Tasmania	600,000	1 0 0	.....		4 6	5 6
Broken Hill Pr'p, s., N. S. Wales	980,000	8 0	1 0	Aug., 1903	1 11 0	1 12 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	1 0	May, 1903	14 6	15 6
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	8 6 3	8 8 9
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Apr., 1903	8 7 6	8 10 0
Great Bo'd'r Pr'p, W. Australia	1,750,000	2 0	9	Sept., 1903	1 7 3	1 7 9
Ivanhoe Gold Corp., W. Australia	200,000	5 0 0	4 0	Apr., 1903	8 0 0	8 2 6
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	Oct., 1903	4 1 3	4 3 9
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	1 15 0	1 17 6
Mt. Lyell M. & R. I., c., Tasmania	275,000	3 0 0	4 3	Sept., 1903	3 0 0	3 2 6
*Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Sept., 1903	2 17 6	3 0 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 3 9	5 6 3
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	5 6	Aug., 1903	7 8 9	7 11 3
Mysore Gold, Colar Fields	500,043	10 0	4 0	July, 1903	6 17 6	7 0 0
Nundydroog, g., Colar Fields	481,000	10 0	1 6	Mar., 1903	2 8 9	2 11 3
Ooregum, g., Colar Fields	343,000	10 0	1 9	Aug., 1903	1 10 0	1 12 6
Ooregum, g., pref., g., Colar Fields	240,000	10 0	1 9	Aug., 1903	2 1 3	2 3 9
African:						
Angelo, g., Transvaal	600,000	1 0 0	6 0	Aug., 1903	6 10 0	6 15 0
Bonanza, g., Transvaal	200,000	1 0 0	10 0	Aug., 1903	3 5 0	3 7 6
British South Africa	4,430,019	1 0 0	rts.	May, 1880	2 11 3	2 13 9
Cape Copper, S. Africa	300,000	2 0 0	1 0	July, 1903	2 11 3	2 13 9
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	July, 1903	2 10 0	2 15 0
City and Sub'n (New), g., Transvaal	340,000	4 0 0	4 0	Aug., 1903	6 10 0	6 15 0
Crown Reef, g., Transvaal	120,000	1 0 0	4 0	Oct., 1903	18 5 0	18 15 0
*De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Aug., 1903	18 16 3	18 18 9
*De Beers Con., def	1,000,000	2 10 0	15 0	Aug., 1903	20 1 3	20 3 9
East Rand, Prop., Transvaal	970,000	1 0 0	5 0	Aug., 1903	7 3 9	7 6 3
Ferreira, g., Transvaal	90,000	1 0 0	15 0	Aug., 1903	19 15 0	20 5 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	6 0	Aug., 1903	6 1 3	6 3 9
Geduld, g., Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 7 6	6 10 0
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1901	8 5 0	8 10 0
Jagersfontein, d., Orange, F. S.	200,000	5 0 0	6 0	Nov., 1899	28 17 6	29 2 8
Jubilee, g., Transvaal	50,000	1 0 0	5 0	July, 1903	5 2 6	5 7 6
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 7 6	3 12 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Aug., 1903	3 17 6	4 0 0
May Con., g., Transvaal	288,750	1 0 0	3 0	Aug., 1903	4 0 0	4 2 6
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Aug., 1903	5 2 6	5 7 6
Modderfontein, g., Transvaal	200,000	1 0 0	rts.	Apr., 1902	9 12 6	9 15 0
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1903	3 0 0	3 5 0
*Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Aug., 1903	3 15 0	3 17 6
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	Aug., 1902	9 16 3	9 18 9
Robinson, g., Transvaal	750,000	5 0 0	5 6	Aug., 1903	10 0 0	10 5 0
Robinson Deep, g., Transvaal	950,000	1 0 0	2 0	Aug., 1903	4 15 0	4 17 6
Rose Deep, Transvaal	425,000	1 0 0	2 0	Aug., 1903	8 2 6	8 7 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 5 0	2 10 0
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1899	12 6	13 9
Village Main Reef, Transvaal	400,000	1 0 0	4 0	June, 1903	7 10 0	7 15 0
Wemmer, Transvaal	80,000	1 0 0	10 0	July, 1903	10 10 0	11 0 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-Dividend.

LONDON (By Cable.*)

Name of Company.	Sept. 15. £. s. d.	Sept. 22. £. s. d.	Name of Company.	Sept. 15. £. s. d.	Sept. 22. £. s. d.
Anaconda	3 15 0	3 15 0	Jagersfontein	29 0 0	29 5 0
British South Africa	2 10 0	2 10 0	Johannesburg Invest	3 0 0	3 0 0
Camp Bird	1 6 6	1 6 3	Modderfontein	9 8 1½	9 10 7½
Con. Gold Fields	6 2 6	6 0 0	Rand Mines	9 15 0	9 15 0
De Beers Con. def	19 15 0	19 15 0	Rio Tinto, com	47 10 0	47 2 6
East Rand	7 3 9	7 2 6	Simmer & Jack	1 8 1½	1 7 6
El Oro, Mex.	1 10 7½	1 10 7½	Tomboy	1 10 0	1 10 7½

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Sept. 10

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Closing. Fr.
Alameda	California	Oil	1,000,000	1	9.50	8.00	7.50
Auzin	France	Coal	.....	.....	200.00	5,750.00	5,750.00
Boleo	Lower Cal.	Copper	.....	500	176.00	1,401.00	1,405.00
Canadian Am	Can	Coal	.....	20	.....	31.50	31.50
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.00	20.50
Courrieres	France	Coal	60,000	300	110.00	2,950.00	2,900.00
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	85.75	90.75
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	370.00	360.00
Malfidano	Italy	Zinc	12,500,000	500	50.00	575.00	573.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	490.00	495.00
Mokta-el-Hadid	Algeria	Iron	18,312,000	500	40.00	840.00	847.00
Nickel	N. Cal'd'nia	Nickel	15,000,000	250	22.50	469.50	470.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	6.50	6.50
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	687.00	682.00
Wyoming	California	Oil	.....	25	.....	294.00	294.00

ST. LOUIS, MO. Sept. 19.

Name.	Par Val.	Shares.	Prices. Bid.	Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Ask.
Am.-Nettie, Colo	$10	300,000	$0.50	$0.55	Columbia Lead, Mo.	$10	50,000	$10.00	11.00
Catherine Lead, Mo.	10	50,000	1.25	2.25	Con. Coal, Ill.	100	50,000	22.00	22.75
Central Coal & C.	100	51,250	62.88	63.50	Doe Run Lead Co.	100	15,000	110.00	120.00
Central C. & C., pf.	100	18,750	72.25	74.00	Granite Bimet. Mi.	10	100,000	.47	.52
Central Lead, Mo.	10	100,000	110.00	125.00	St. Joe Lead, Mo.	10	600,000	16.00	17.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.13
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09¼
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.08¼
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.01¾
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		20.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood, 95@97%	"		.55@.55
Purified	"		1.25@1.30
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		1.00
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06¼
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18	"		.03¼
20	"		.03¼
26°	"		.0 ½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.07½
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		30@.40
Needle, lump	"		.0 ½@.06
Powdered, ordinary	"		.05¼ a .07¾
Oxide, com'l white, 95%	"		.03½
Com'l white, 99%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03 @.03½
Red	"		.03½@.03¾
ASPHALTUM—			
Ventura, Cal.	sh. ton		32.00
Cuban	lb.		.01½@.01¾
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh. ton		25.00@27.00
92@98%	"		26.00@29.00
Powdered, 80@90	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst.	lb.		.05
Nitrate, powdered	"		.05½
BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.02
BARYTES—			
Am. Crude, No. 1	sh. ton		9.50
Crude, No. 2	"		8.00
Crude, No. 3	"		7.00
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		18.00
BAUXITE—Ga. or Ala. Mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk	"		.40
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		1.60@1.85
Foreign	"		1.95@2.50
"Rosendale," 300 lbs.	"		.80
Slag cement,	"		1.50@1.60
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh. ton		3.25
Ppt. per quality	lb.		.04@.05¼
CHLORINE—Liquid	"		.80
Water	"		.10
CHROME ORE			
(50% ch.) ex-ship N. Y.	lg. ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.30
COPPERAS—Bulk	100 lbs.		.47½
In bbls.	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25-lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro (32-2-10° Be.)	"		.12½@.12⅝
FELDSPAR—Ground	sh. ton		8.00@9.00
FLINT PEBBLES—Dan. Best	lg. ton		14.75
French, Best	"		11.75
FLOURSPAR—			
Am. lump, 1st grade	sh. ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr.	"		13.40
2d grade	"		12.90
Ground, 1st grade	"		17.80
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
Am. pulv., other than R. I., f. o. b., New York	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01¼@.02
Ceylon, common pulv.	"		.02¾@.03¼
Best pulverized	"		.04@.06
Italian, pulv.	"		.01¼
GYPSUM—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.01
Oxide, pure copperas color	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.82
Finishing	"		1.02
MAGNESITE—Greece,			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh. ton		15.50
Bricks, best imp., f.o b. N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		130.00@200.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—			
Crude powd.			
70@75% binoxide	lb.		.01¼@.01½
75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.03½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, Foreign	unit		.18@.19
Domestic, 1st quality	"		.30
MARBLE—Flour	sh. ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. grind, coarse	sh. ton		33.00@38.00
Fine	lb.		.00¾@.02
Sheets are sold as to size and quality.			
MINERAL WOOL—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.14@.14½
Zero	"		.18½@.19
Summer	"		.13@.13½
Cylinder, dark steam ref.	"		.14½@.15½
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.21
Extra cold test	"		.25@.31
Gasoline, 86 @90	"		.17@.22
Naphtha, crude, 68°@72°	bbl.		12.40
"Stove"	gal.		.15
Linseed, domestic raw	"		.36@.39
Boiled	"		.40
Calcutta, raw	"		.65
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.14
Yellow, common	"		.10½
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05½@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06¼@.08¼
PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh. ton		$19.00
Red	"		15.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04½
French, washed	"		.01¼@.01½
Orange mineral, Am.	"		.08
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.03½@.06½
Foreign	"		.06½@.06
Turpentine, spirits	gal.		.60@.60½
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¾
Zinc, white, Am., ex. dry	"		.04½@.04¾
Foreign, red seal, dry	"		.06@.08¼
Green seal, dry	"		.03½@.06½
POTASH—			
Caustic, ordinary	"		.04½@.04¾
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst.	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am	"		.08½@.08¾
Scotch	"		.08½@.09
Bromide	"		@.80
Carbonate (80@85%)	"		.03¼@.04¾
Chlorate, powd.	"		.06¾@.07¼
Crystals	"		.06½@.07
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg. ton		9.80
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95	"		1.86
Permanganate	lb.		.09½@.09¾
Prussiate, yellow	"		.14@.14½
Red	"		.36
Sulphate, 90%	100 lbs.		2.11
95%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.15
N. Y. agricultural	sh. ton		4.40
SALTPETRE—Crude	100 lbs.		3.30
Refined	"		4.00@4.50
SILICA—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord.	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.36¼
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ord., bulk f.o b. wks.	100 lbs.		1.25
Extra domes., f.o.b. w'ks.	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¾
Carbonated ash, high test, in bags, f.o b. works	100 lbs.		.75@.82½
Foreign, f ob. N. Y.	"		.90@.92½
Caustic, 70@76% f.o b. w'ks.	"		1.65@1.70
" 60%	"		1.80@1.85
Foreign, f.o.b N. Y.	"		1.50@2.00
Chlorate, com'l	"		.07@.07¾
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.25
Shipments	"		2.05
Peroxide	lb.		.45
Phosphate	"		.02½@.02¾
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.07½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¾
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.25
TALC—N. C., 1st grade	sh. ton		20.00
N. Y., Fibrous, best	"		10.28
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.70
Oil, bbl.	"		4.70
TIN—Crystals	lb.		.22¼@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¾
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.15
Dust	"		.03¼@.04¾
Sulphate	"		.02¼@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07½@.08¼
THORIUM—Nitrate 49@50%	"	4.50
URANIUM—Nitrate	oz.	.20
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.